THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. XCIII. No. 2227.] LONDON, JANUARY 16, 1906. [58TH YEAR. PRICE 6d.

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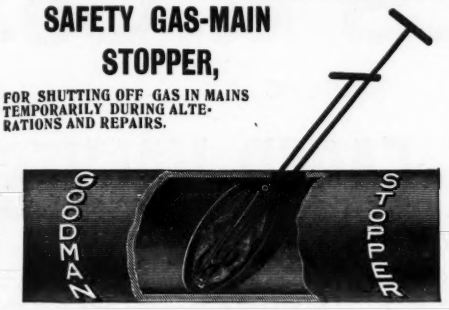

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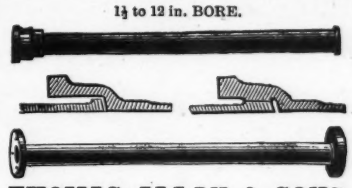

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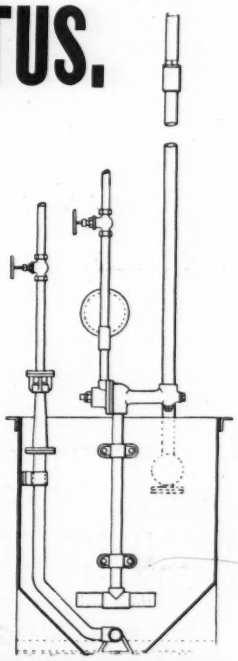

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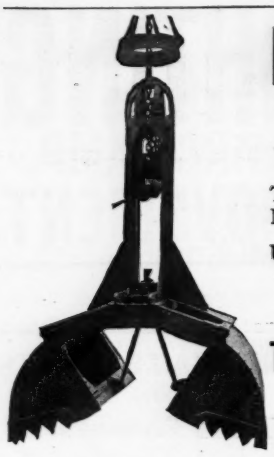

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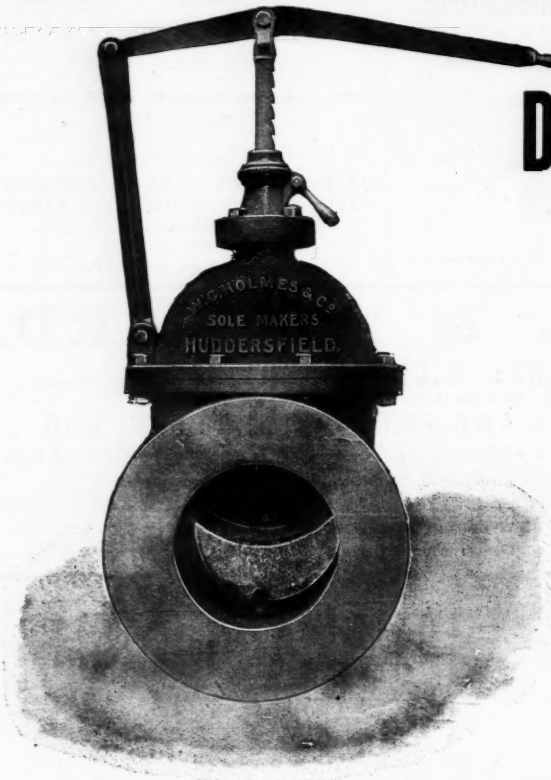

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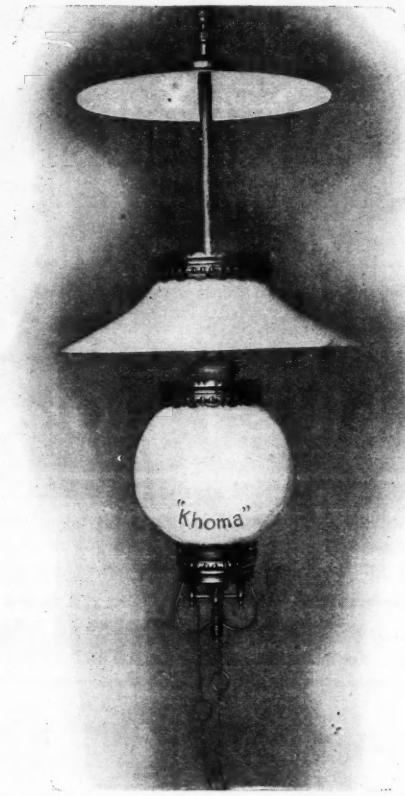

There are some people who have doubts as to the value of heating the gas used for incandescent lighting preliminary to combustion. The question may be simply settled, each one for himself, by comparative photometrical tests. The idea has received the support of many careful scientific investigators. Among the latest to carry their researches into this particular field are Drs. F. Haber and F. Richardt, whose valuable dissertation on "The Bunsen Flame, and Methods for the Chemical Determination of Flame Temperatures" was noticed at some length in the "JOURNAL OF GAS LIGHTING" for the 31st of January. Being towards the end of that article, it may have escaped the attention of some readers that there these investigators said: "The temperature of combustion of a gaseous mixture may be raised by a preliminary warming of the gas at the expense of the combustion products (as in regenerative furnaces), but not at the expense of the burning gas itself—that is to say, by subsequent, but not simultaneous, warming."

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It is the practice of the "Gas World" to publish from time to time analyses of the accounts of Gas Undertakings in this Country. A number of such analyses appeared in the issue for September 16, and they show that at Fenton, Longton, Rotherham, and Tipton, some of the highest results were obtained in Gas Made and Coke Sold.

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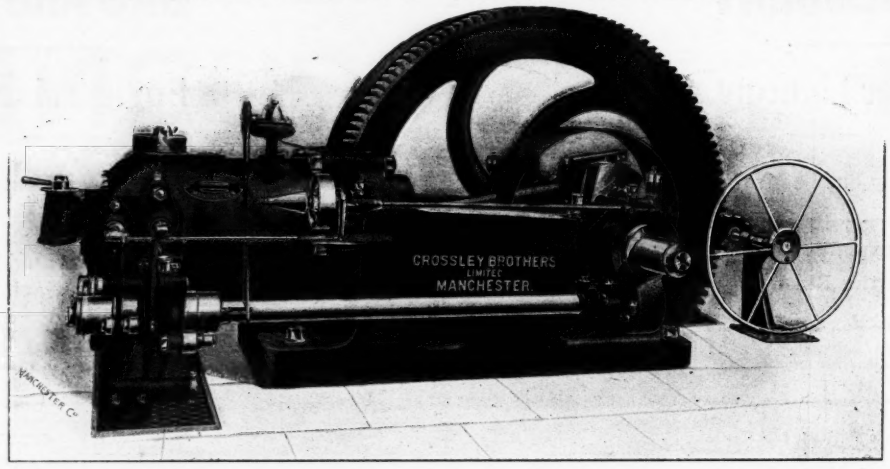

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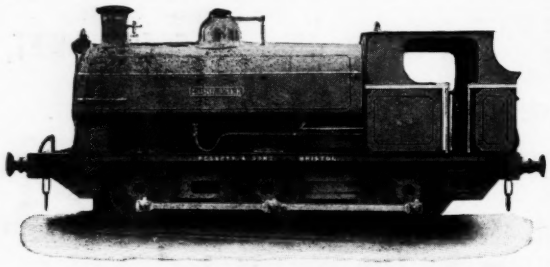

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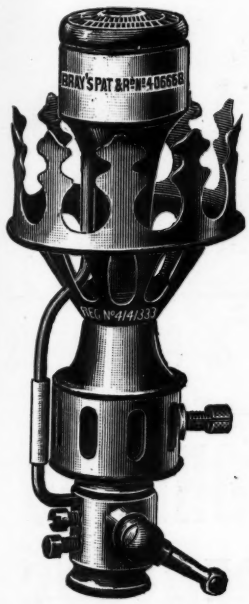

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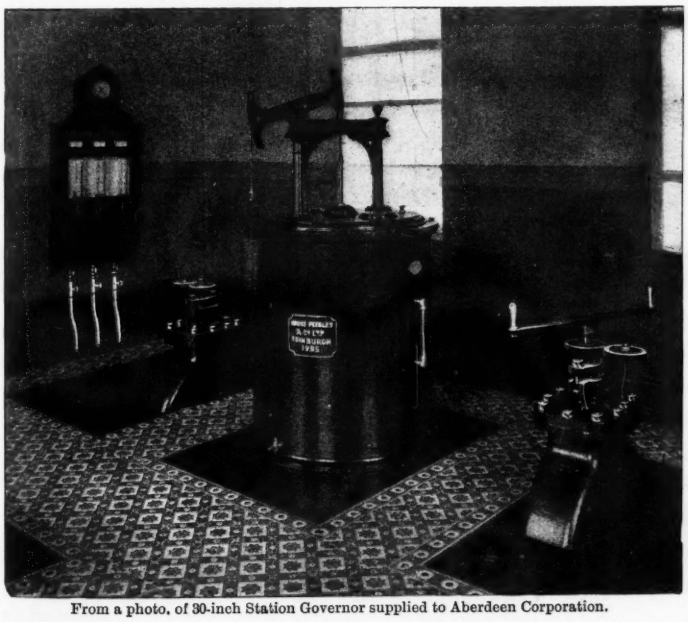
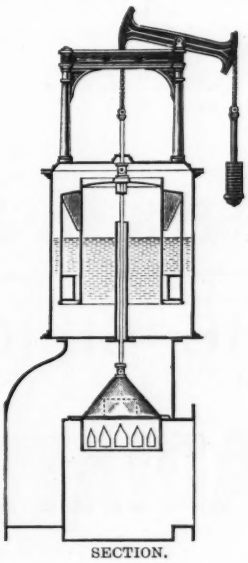


From a photo. of 30-inch Station Governor supplied to Aberdeen Corporation.



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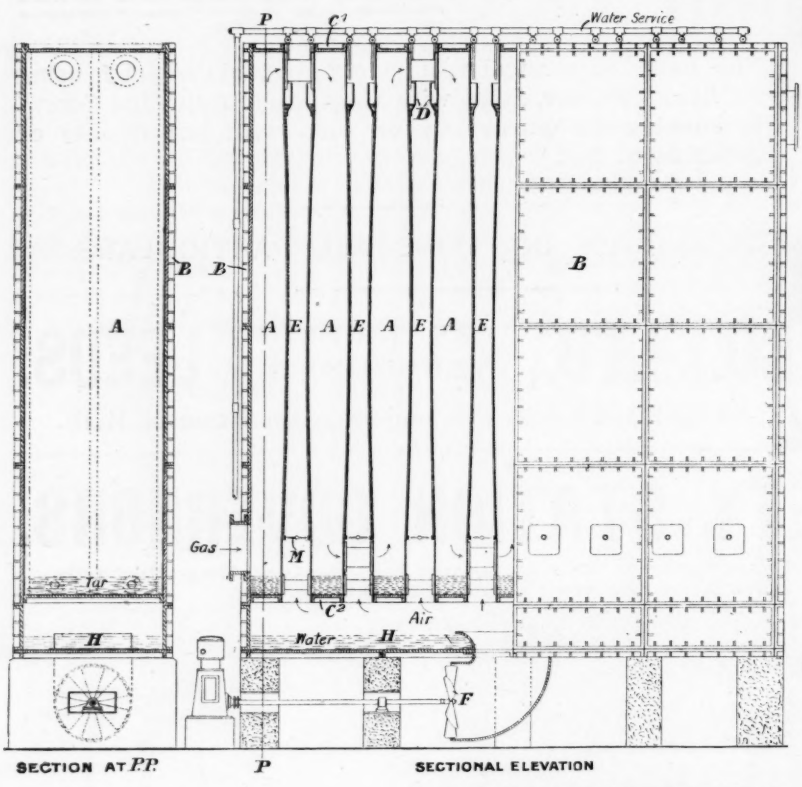

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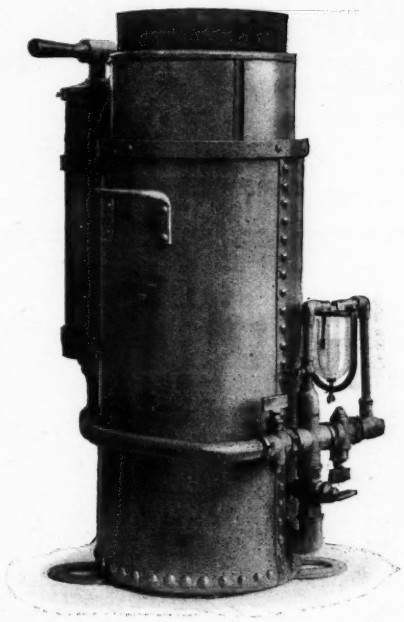

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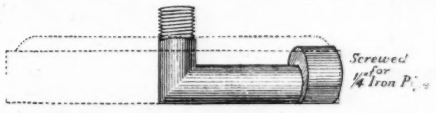

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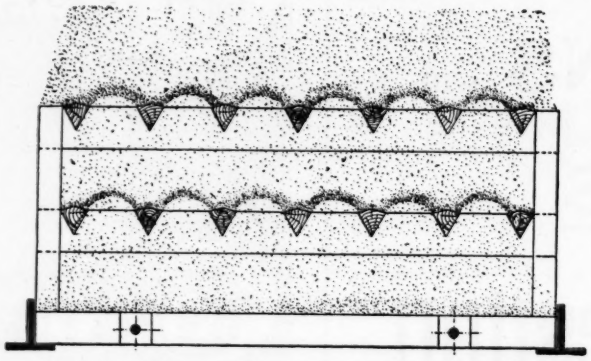

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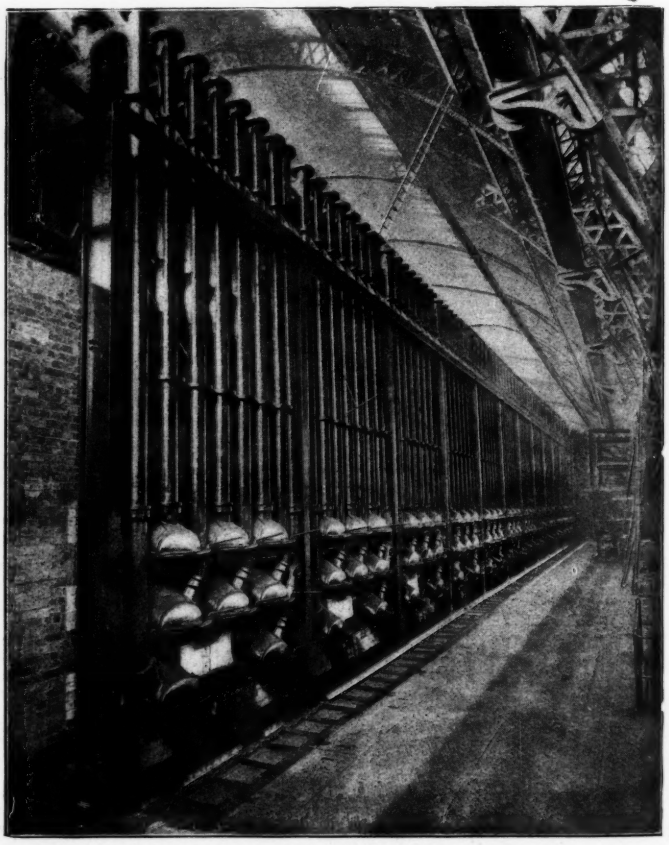

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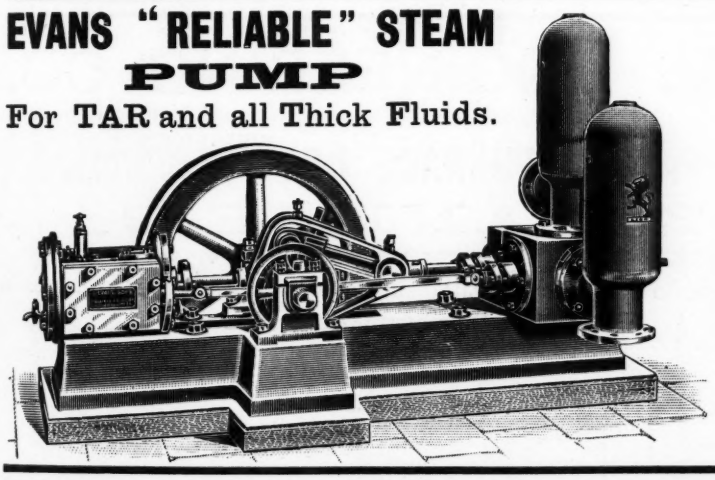

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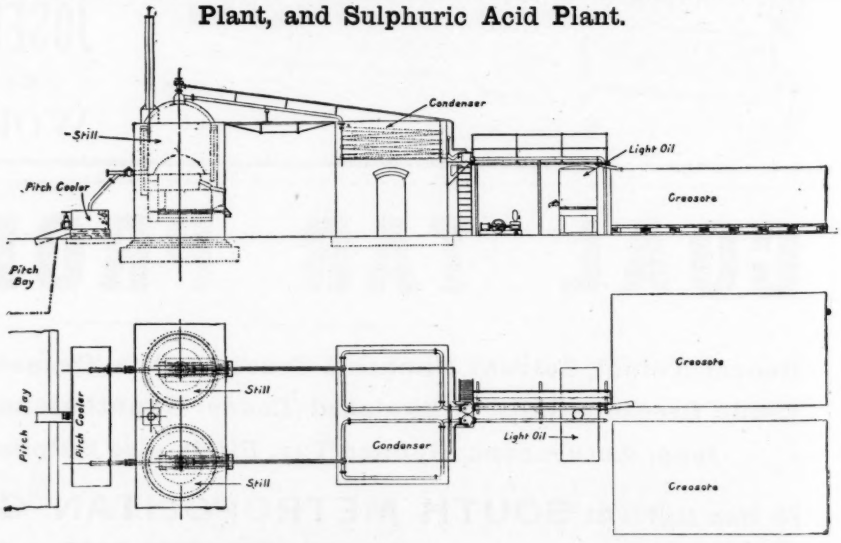

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EDITORIAL NOTES—GAS, &c.

The Reflections of the Gas Bills.

TIME effects change in most things; and in the Gas Bills promoted by Gas Companies are mirrored the immense changes in gas supply that the past few years have wrought. New works and more capital are needed; the gas supply itself, as was pointed out last week, is not now one that requires to be charged as of yore with the illuminating elements requisite to an unsupported luminosity; and new branches of business demand prescript and protection. The Statutory Companies' Bills for the session now near at hand breathe progress, and reveal, clause by clause, the little identity that these measures have with those of but a few years since.

Take capital as an example. Many Companies asking for an extension in this regard now, notwithstanding the existence of big, flourishing, and soundly established and financed businesses, find it necessary and prudent to ask for additional capital, double, treble, or quadruple that which they saw would serve their purpose for some years when last they were in Parliament. It is the effect of progress—progress developed from a strong and definite combination of circumstances, each of which brings its influence to bear upon the others; and that progress has opened to us what will be known in the pages of the industry's history as the cheap-gas era. The requisitions of the prepayment system have made a substantial difference to the authorized powers of capital raising and expenditure, and so has the character of works' equipment. And on these things the imperative extension of gas-producing capacity, in the many places undergoing residential and industrial development, claims more and more of the capital account. Expansion of capital needs is therefore a feature of the Gas Companies' Bills that have been under notice; and, conjoined with it, the sensible and now generally approved co-ordination of heterogeneous classes of capital is quite common this session. There is economy of time and labour in the simplification of capital accounts in this way; and it gives greater freedom in dealing with and placing capital, which is an advantage to Companies who are, through accelerated advance, often in want of new capital, and to those who are alive to the soundness of the policy of having consumers who are also recipients of dividend from the business they help to support. This conversion of capital to a more manageable rank, in which nominal and market values have a closer relationship, is one way of getting stock distributed among consumers; but the more direct route (in which the foregoing is a helpful factor), by obtaining power to offer new issues to gas consumers and employees before speculators and the moneyed investors have the opportunity of absorbing it all by public auction or tender, is not so generally sought as we had expected it would be. In connection with expenditure on works, plant, and appliances generally, electricity undertakings should note how very general in the business of gas supply is becoming the provision of renewal funds.

Passing from the capital employed in production and sale to the commodity itself, it was shown last week how certain was the entry that Companies had now made into the lower illuminating powers. Three statutory Companies and one non-statutory Company, had been found in the Bills for next session who were proposing to detach themselves from conventionality, and ask Parliament to allow them to supply 13-candle gas. This week we have discovered yet another Statutory Company—the Uxbridge—who are asking for a 13-candle test; and the repeal of the section of their Act of 1873 which prescribes gas of 14 candles. It is interesting to observe that several of the Companies whose Bills were noticed last and this week have left quite open, by the wording of the clauses applying to the matter, the specification of the burner to be used in testing gas of 14 or 13 candles. The exigencies of drafting and depositing are without doubt responsible in the main for this; and, before the end of the session, we may see several of the indefinite clauses made rather more definite by the naming of the "Metropolitan argand burner No. 2." In the Cheltenham Gas Bill, it is proposed that the burner shall be the "Metro-"politan" argand burner No. 2, "or such other burner "and chimney (if any) as may be, for the time being, pre-"scribed by the Referees under the City of London Gas "Act, 1868," &c. It is wondered why there is now such particular affection for the 1868 Act that it should have special mention in this Bill, seeing that the London Gas Act of last session practically re-enacts the pertinent provision in the Act of 1868, and the Gas Referees are hardly likely to again specifically prescribe a burner under the Act of 1868 with that of 1905 in force. Bearing upon the first article in the "JOURNAL" last week, it will be remarked that quite a number of the Provincial Companies are prescribing in testing the table photometer and Harcourt's 10-candle pentane lamp. But the Cheltenham Company prefer to adopt the pentane lamp with the bar photometer; and the South Suburban Company are also evidently of the same mind. Other Gas Companies in Parliament may do well to re-read the article on p. 83 of last week's issue, and make inquiry on their own account into the matter.

A companion subject to testing at the present time is that of the abolition of the restrictions affecting sulphur compounds other than sulphuretted hydrogen. In addition to the Bill that had its origin in the Gas Companies' Protection Association, and which seeks relief for fourteen Companies, Cheltenham, Derby, Southampton, Tottenham, and Wandsworth are applying independently for the abrogation of the clauses. The Wandsworth Company are also included in the common Bill; and their separate application is merely to ensure that, in the unlikely event of the joint Bill not succeeding, they, having secured the support of the Borough Council, will not fail to obtain the alleviation that the Departmental Committee of the Board of Trade advised Parliament that gas undertakings should have, and which advice Parliament so thoroughly accepted last session. The combined opposition that municipal officialism (with a fine disrespect for the distinguished Departmental Committee who were particularly competent to judge this sulphur question, and for the precedents of last session) tried to incite in connection with this jointly-promoted Bill does not seem to have very greatly flourished up to the present. Unity has not been obtained by the prime movers. Whether this had anything to do with the postponement of the conference that it was proposed should be held a fortnight since, we are not aware; but the General Election at the last moment was given as the reason for the delay. Whatever the cause, the local authorities will be well advised to desist from wasteful expenditure over a matter upon which Parliament has already pronounced such a positive verdict.

The Bills under notice this and last week also reflect the freedom that the Gas Companies desire to maintain in the matter of bargaining for large business, such as power consumption. There is a conspicuous absence in the Statutory Companies' Bills of the restrictive discounts clause, which means that the promoting Companies are seeking to maintain liberty of contract, providing that concession under like conditions has equality. The public lighting condition which we have lately discussed, and which also confines movement in business transactions is proposed for amendment in the Derby and the Sutton, Southcoates, and Drypool Gas Bills. All that is being asked is that the stipulation as to the lowest price to any consumer may be interpreted in the light of the conditions existing when the clauses were enacted. The Tottenham and the Mirfield Gas Companies (the Truro Company was also mentioned a fortnight since) are both asking for authorization to manufacture and supply power gas for the purpose of meeting the demand that has arisen in the local industries; and, in each of these instances, a short clause, unembroidered with any legal verbiage and unweighted with any restriction, is rightly considered amply

sufficient for the purpose. All that the promoters ask to be allowed to do is the best possible as between themselves and their power consumers. The expediency of gas companies "affording facilities for the development of trade and "manufacture in their district" by the provision of a cheap gas supply is acknowledged by the applications for these special powers. As a present economic problem, the question of superiority of the relative policies of a dual supply and the whittling down of the ordinary supply to a condition suitable to its many purposes, and at which special rebates can be made, must—with this new feature in certain Acts of recent sessions, and in three Bills to be promoted in the coming session—soon mingle in the industry's polemics.

The last point to note has connection with the application for electricity powers by gas companies. It is remarked that provision is made for compulsory reductions in the price of electricity when, if ever, the profits exceed the maximum requirements in accordance with the terms of the Act; but in the case of the Brixham Bill, it is proposed that the aggregate profits of the gas and electricity concerns are to be taken (regard being paid to any reduction made at the same time in the price of gas) in making from the excess a rateable reduction in the charges for electricity. The accounts of the undertakings being kept separate, it would be preferable to carry the policy right through; for it goes much against the grain to have the profits of a long-established gas business in any way trenched upon for the benefit of the electricity consumers.

For Parliamentary Honours.

THE appeal that the two great political parties, with their subordinate sections, are making to the country has exceptional interest for the gas industry, in view of the appearance in the contest of several men whose names are as household words among us, through their association with the industry's work, and some of its most memorable struggles, in the past. If certain of these notables succeed in winning the suffrages of the electors to a degree sufficient to carry them to the House of Commons, the Parliamentary Bar will lose heavily in distinguished leaders; and the mature experience which they possess in the conflicts of the gas industry at Westminster will be decidedly to our loss. But we shall at least be able to count upon that experience being beneficially used on behalf of the industry within the House should at any time occasion require. There is Mr. J. H. Balfour Browne, K.C., courting the confidence of the people of Dumfriesshire; Lord Robert Cecil, K.C., is seeking to represent Marylebone; and Mr. E. M. Pollock, K.C., is wooing the electorate of Spalding. The transfer of the eloquence of these brilliant controversialists from the Committee-rooms to the House would unquestionably be a distinct gain to the debating power on the Unionist side. Mr. C. A. Cripps, K.C., is also inviting his constituents to return him to the House.

Whatever the individual political view may be, there will be unanimous approval and congratulation from the gas industry to Mr. D. Ford Goddard on being at the head of the poll at the first contested election. Up to about a month ago, it was expected that Mr. Goddard would not again seek parliamentary honour. He, however, reconsidered the matter; and his native town of Ipswich has repledged its confidence in him by an unprecedented majority, and maintained the leading position he has occupied at the two previous elections. Some of the younger members of the gas profession may not know that as long ago as 1882 Mr. Goddard succeeded his father in the engineership of the Ipswich Gas Company, which post the latter had occupied for about forty years. Mr. Goddard is now the Chairman of the Company; and he is likewise a Director of the Tottenham and Edmonton Gas Company and of the South African Lighting Association, Limited. In him the industry has an excellent champion. Sir S. A. Sadler is also seeking re-election; and Sir J. Fortescue Flannery, Bart., has relinquished Shipley in favour of Cardiff, whose interests he hopes to be permitted to serve. He is an engineer by profession; and a member of the Board of the South Suburban Gas Company. The workers of the gas industry will be interested in learning that, though a member of the Unionist party, Sir Fortescue has done excellent work for the Amalgamated Society of Engineers, and has been specially commended to the members of the Society for support. The section, too, of labour that is identified with the Gas Workers' Union, will obtain very direct representation in the House if the Secretary of the organization (Mr. Will Thorne) proves successful in his candidature at West Ham. By the time this issue of the "JOURNAL" reaches our readers, the results of some of the contests in which the gas industry as such will find special interest, will no doubt be known.

The larger political questions upon which the election is being fought do not claim consideration here. But it is permissible to express agreement with Sir Henry Campbell-Bannerman that at the present time industry is greatly burdened, and enterprise restricted. The remedy for this, however, is not to be found in the ideals of his colleague Mr. Burns, who would give wider power to local authorities, would confer upon the London County Council all the powers enjoyed by other municipalities, and would give to London "a unification of complete municipal self-govern-"ment, with power to acquire all existing monopolies." Under the circumstances, it is pleasing to know that the power of Mr. Burns is not absolute. Again, the unburdening of enterprise would not be accomplished by the realization of the socialistic doctrines which are being promulgated with so much assiduity at this election, and of the danger of which Mr. Morley has uttered a warning. Votes, it is also noticed, are being captured by promises to trade unionists of enactment to give them, and their funds and practices, greater security. No one will deny to labour the right to combination, so long as it is not used tyrannically towards industry and that not inconsiderable section of labour who prefer liberty to the rule that trade unionism inflicts upon them as individuals. The freedom of trade unionism has been in late years considerably curtailed by the interpretations of the law; and during that period there has been greater industrial peace than before. Upon those who seek by legislation or other means to disturb that peace, a heavy responsibility will rest.

The First Gas Association in Victoria.

HEARTIEST greetings from the Old Country to the first professional Gas Association in Australia. We offer these greetings, and cordial wishes for success, with the fullest assurance that they will find a responsive echo in the hearts of every gas engineer and manager at home. The new Association has been established at an eventful time. It marks the jubilee of the opening of the first gas-works in Victoria; and it starts at a period when competition, more than ever in the history of gas supply, necessitates the closest possible union of responsible officials, so that the advantage that comes from intercommunication of intellect and varied talent may be brought to bear upon the every-day work of the industry. At home, gas engineers and managers, enjoying as they do the comprehensive benefits of propinquity, have the fullest sympathy with those who labour in distant parts at greater disadvantage through isolation, and in (save a few exceptionally favoured instances) districts the sparseness of which presents almost disheartening difficulties to development, and favours the adoption of private electric lighting and acetylene plants, and the continuance of kerosene lamps. In such cases, there is all the greater need for periodical conference by those holding the responsible offices, though the offices may vary much in rank. Intercourse between the officials of large and small works has, experience records, a mutual value; for while the manager of the large gas-works can exhibit the advances of contemporary engineering, the manager of the small works can show in his sphere many "wrinkles" that subscribe to the truth of "Necessity being the Mother of "Invention." From the founding of this Victorian Association, therefore, must eventuate benefit to the undertakings whose fortunes, so far as is humanly possible, are directed by their qualified officers.

The Association will, through the reports which we shall welcome from time to time, tighten the bonds between the home gas profession and their colleagues of far-away Victoria. Interest will also be deepened by personal knowledge. The first President is Mr. R. O. Thompson, the Chief Engineer of the Melbourne Gas Company, whose genial presence was constantly among us prior to, and during, the time of the International Gas Exhibition at Earl's Court. The Vice-President (Hon. George Swinburne) is known to many of our readers, and bears high reputation at home as well as in Australia as a gas administrator. The Hon. Secretary

and Treasurer (Mr. Philip C. Holmes Hunt) is the son of a worthy and distinguished sire; and it is clear from the report of the proceedings at the meeting of the Association at which the organizing work was completed, that its successful foundation is largely attributable to Mr. Philip Hunt's energy. He was trained in his professional work among surroundings which inculcated the advantage of association with one's fellows of similar engagement and aspiration; and to the work of his new office, he brings experience gained in a somewhat similar capacity during the latter years of his residence in Birmingham. Personal interest, too, in the new Association, has been further linked by the recent visits paid to the Antipodes by Mr. William King and Mr. W. A. Valon.

The Association has made an excellent start. At this introductory meeting there were present some 33 gentlemen representing the official life of the gas industry in Victoria; and they were accorded the warmest encouragement by the premier gas undertaking of the State. An instructive address was delivered by Mr. Thompson, in the capacity of Chairman, before his election to the Presidency. The history of gas supply in the State is not a large one, but it is interesting; and it furnished him with appropriate topic for this particular occasion. This country has given to Victoria, the greater number of her trained gas men; but it is observed that Mr. Thompson is now of opinion that the time has come when attention should be paid, in Australia, to the future training of the gas experts required there, in order that in time it may become self-sustaining, and not be altogether dependent upon the Old Country. The ambition is praiseworthy; but, like most other questions, it has two sides. Mr. Thompson himself admitted that Great Britain stood in the forefront of gas engineering; speakers at the meeting confessed that for the most part they were the representatives of small undertakings; and the account which we give of the plant at the station of the Melbourne Gas Company that the members visited shows how completely it had its origin in this country. The opportunity for the development of plant in Australia is circumscribed, and so is the opportunity, except in the few works, for the immediate application of new processes and apparatus. And therefore it seems to us that, as an effect of circumstance, the fitting training for the gas engineer and manager for the Colonies is the present one, including as it does training in the home of structural and plant development and further works and business management under the local conditions. The best-trained professional man is the one who, possessing aptitude, enjoys liberty of view in youth.

In wishing the new organization the utmost success, we would tender the Committee the advice to make the basis of membership as broad as possible from among those holding official or administrative position in the gas undertakings. Activity is very largely defined by the funds at command; and the greater the membership, the better will stand the balance in the hands of the Hon. Secretary and Treasurer for utilization on favourable occasion. We hope, too, that the Boards of Directors will appreciate that such conference as the Association will afford will be of greater advantage to their undertakings than to their officials, and, recognizing this, will give every facility for, including the payment of reasonable expenses incurred in, attending the meetings. The expenditure, we have no hesitation in saying, will be a remunerative investment. Victoria is the first State in Australia to boast a Gas Association. Which will be next?

The Sulphate of Ammonia Market.

PERUSAL of the valuable annual review, issued by Messrs. Bradbury and Hirsch, of the sulphate of ammonia market during the past year will not, gauging the immediate future by the course of events in the immediate past, give any ground for encouragement as to an early substantial improvement in either the price or the position of sulphate of ammonia. There is an amount of satisfaction to be derived from the fact that the average price of the commodity was some 7s. 1d. higher during 1905 than in 1904; but when it is seen how completely this price betterment was due to adventitious circumstances, it is quite easy to realize how near we were to the average price being perhaps nearly as much below the average of 1904 as in the result it was above it. The coal strike in Germany in the early part of the year gave a good spurt to the demand upon this country, and at augmented prices; and in the second half of the year, there was an extraordinary increase in the demand from Japan. Even with these extraneous aids to higher returns, the average price of £12 10s. 9d. was only 1s. 7d. more than was obtained in 1903; while the average price of nitrate of soda—£10 15s.—was £1 5s. better than in 1903, and 11s. 8d. higher (as against 7s. 1d. for sulphate) than in 1904. The superior merits of sulphate of ammonia notwithstanding, it is seen from these figures, that—gratifying as it is to have the improved price for sulphate—nitrate of soda for some inconceivable reason has still a considerable balance of gain in its favour.

Taking a survey of the position that the review puts before us, and so judging of the prospects, the appearances are such that there will be ground for much satisfaction if the current year closes with an average price as good as that of the past. The production of sulphate continues to increase; the home demand practically stands still. Production on the Continent does not pause in its increase; but Continental demands upon the United Kingdom have lately considerably declined. The same tale applies to the United States; but other distant trade is much more encouraging. The estimated increased production from all sources in the British Isles in 1905 was about 12,000 tons; and the ascent in the exports balances, with an excess of a few tons, this increase in production. But against this accession of business in distant quarters has to be set the somewhat precarious demand of Japan, which last year reached 33,861 tons, against 14,981 in 1904, and 3612 in 1903. From these various considerations, there can only be deduced the belief that, while there is every prospect of a recovery from the depression of the last few weeks, the outlook does not bid us hope for any exceptional advances in the demand for sulphate such as will cause the average price to mount yet nearer to the figures that ruled in 1893 and 1894, from which years the average has never been so high as in the past year.

In the tables extracted elsewhere from Messrs. Bradbury and Hirsch's report, it will be noticed how stationary the sulphate of ammonia output of British gas-works has been since 1902; this being attributed by the reviewers to the progress of electric lighting and to the increased production of water gas, to which we would add the staying power upon the rate of increase in gas consumption of the incandescent mantle. When these various factors are taken into account, it is a matter for satisfaction to find that the output of sulphate of ammonia has been so consistently maintained during recent years. A year ago it was estimated that in 1904 the gas-works output had advanced by some 4000 tons; but subsequent enlightenment blotted out the estimated increase. In the past year, gas-works are credited with having shown an advance of 1500 tons; it will be a gratification later on to learn definitely that there has at length been this departure from the 150,000 tons that the past three years appeared to have almost immovably established. From coke and carbonizing works and Mond gas plants, there have been increases in output; and to a smaller extent from iron and shale oil works. The review indicates conclusively that home producers must not abate activity in the cultivating of fresh outlets. Certainly, the higher prices ruling in the market for nitrate of soda should prove of some assistance to the Sulphate of Ammonia Committee in their adopted courses of propagandism.

The Rating of Machinery.

Mr. Arnold Goodwin, the Hon. Secretary of the London Machinery League, keeps us abreast of all that is passing in respect of this very important industrial question. In the case of *Kirby v. The Overseers of Hunslet Union*, the House of Lords recently gave that final decision which places beyond dispute the power of local authorities to rate machinery in any building. In other words, it has been definitely held that rating authorities have power to rate not only the hereditament, but the machinery introduced into it to fit it for the purpose of the tenant. Mr. Goodwin still contends that this was not the intention of the Legislature, as is indicated by the Exemption Act of 1840, which specifically declares that it is absolutely unlawful for the overseers of any parish, township, or village to "tax any inhabitant in respect of his ability derived from the profit of stock-in-trade or any other property for or towards the relief of the poor." The important question, however, is as to the future; and in the inequality of rating

conditions all over the country, which may and do unfairly penalize manufacturers in the race for competitive business, there is the ground for further action. Appeal is also made by Mr. Goodwin for aid in the parliamentary movement to harmonize the law with the avowed intentions of Parliament as expressed in the Exemption Act of 1840; and, in doing this, he recalls to mind the fact that the Royal Commission on Local Taxation deliberately advised the exemption from assessment of any increased value arising from machinery, tools, and appliances not fixed, or only so fixed that they can be removed from their place without necessitating the removal of any part of the hereditament. One illustration as to the inequality that exists. The Royal Commission advised that "the value of any machinery or plant used in or on the hereditament for producing or transmitting first motive power, or for heating or lighting the hereditament," should only be included in the assessment. The Scottish members practically embodied this advice in a Bill, which passed through Parliament; and as a consequence, in Scotland movable machinery is exempt from assessment. The Recorder of Liverpool last week, in an appeal involving the rateability of a large quantity of milling machinery, held himself bound by the Hunslet case.

The Coal Tax.

Several British Gas Companies operating abroad are substantially interested in the question of the tax levied on exported coal. What it means to the Imperial Continental Gas Association alone was vividly shown by Mr. J. Horsley Palmer at the last meeting of the proprietors. He stated that they would be shipping during the then coming season probably 270,000 tons of English coal to the Continent; and on this they would have to pay 1s. a ton. And not only that. Directly the tax was put on, the people who controlled the Continental coal mines raised their prices for coal by a corresponding amount. So that practically the Association had to pay the tax on the 900,000 tons they used in the course of their operations. The present election is serving as an excellent opportunity for pressing the representatives of the respective parties as to their attitude on the question of the extinguishing of the tax. One correspondent has elicited from Mr. Chamberlain that he is personally in favour of the repeal of the tax, "which was imposed during the war, and which has not answered the expectations formed of it." Mr. Chamberlain also "believes" that the late Chancellor of the Exchequer intended to repeal it if he had remained in office. The South Wales and Monmouthshire Coal Conciliation Board have also sent a communication to Mr. Asquith, the present Chancellor of the Exchequer, on the subject. Both miners and owners are anxious to get rid of the tax; and the representatives of the former on the Board have stated their willingness to co-operate with the employers in their efforts to secure its abolition.

Moisture and Light Standards.

The effect of carbonic acid, barometric pressure, and moisture on the pentane lamp was dealt with in an appendix to the report of the Research Committee submitted at the last meeting of the American Gaslight Association. The author—Mr. J. B. Klump, the Inspecting Engineer of the United Gas Improvement Company of Philadelphia — refers to previous studies of the question of Dr. Liebenthal, Mr. C. C. Paterson, and Mr. Rollin Norris, and states that, while the variation of the lamp for carbonic acid present is practically negligible, the effect of moisture (accepting Mr. Paterson's work as correct) is considerable. To show the extent of the variation of humidity, and the necessity for making corrections, Mr. Klump quotes the monthly average humidity conditions in Philadelphia for the last 34 years, and their effect on the candle power of the 10-candle pentane lamp. The result proves that the lamp has a value above the normal during dry months, and below it in the humid period of the year.

"Strike" of Gas Consumers in Paris Suburbs.

It seems that the gas supply of Paris and its suburbs is fated to be provocative of discontent. With the incoming of the present year, and the expiration of the Gas Company's concession, the service in the suburbs has passed into the hands of the new Company whose works were described in the "JOURNAL" for the 2nd inst. The formation of this Company was sanctioned on the understanding that the price should be assimilated to that now charged in Paris—namely, 20 c. per cubic metre; and the arrangement has doubtless given much satisfaction to the consumers in the places included in the defined area. This, however, does not comprise several towns in the department of Seine-et-Oise—Meulan, Les Mureaux, and Hardricourt among the number—which are supplied by a smaller Company; and in these the feeling displayed is of a very different character, inasmuch as the charge there is 30 c. per cubic metre—the figure which ruled for so many years in the City. The discontent has culminated, according to the Paris Correspondent of the "Daily Telegraph," in a "strike" by the consumers, who have determined not to burn any gas in their shops, factories, or private houses until the Company have conceded their demand for a reduction. There has consequently been a general resort to paraffin lamp oil, acetylene, wax candles, and even the once-despised tallow dips. The consumers have evidently become exasperated at the refusal of the Company's manager to favourably consider their claim to be placed upon an equality with those in neighbouring towns; and it will be interesting to see whether the strong measures they have taken will have the effect of stimulating him to conciliatory action.

Nitrate of Soda Combination.

From various reports which have come to hand, the future of the nitrate of soda market appears to be clouded with uncertainty. Early last month, the information came from Iquique, and fell with depressing effect upon the market, that negotiations for a renewal of the existing combine were temporarily broken off, owing to (one report states) certain producers not seeing eye to eye with the Iquique Directorate upon the question of quotas. Conference brought about some better understanding; but this is spoken of in such guarded terms that it is difficult to form any judgment as to its durability. However, the immediate effect was a recovery of prices to almost, if not quite, the level at which they stood before the breach. There is a want of agreement in the sources of information as to the result of a renewal or otherwise of the combination. It has been a good thing for producers, owing to the maintenance of prices through its influence. In one report it is thought that, under existing labour conditions in Chili, the abandonment of combination would prevent the aggregate production attaining the maximum quota which might be allowed under combination, while the price would most probably go a great deal lower. In another report, is mentioned the expectation that the collapse of the combination would result both in increased production and in lower prices. Messrs. Bradbury and Hirsch, in their annual report, also refer to the matter—speaking of the uncertainty that exists as to the probable action (assuming that the combination will be renewed) of the Nitrate of Soda Committee. The views of these intimates with market operations are always received with great respect; and it is considered by them as highly probable that any renewal must involve increased quotas in order to satisfy the native proprietors. Higher prices for nitrate would certainly tell favourably upon sulphate of ammonia.

The Inland Revenue and Conveyance Duty.

This question we had begun to think was being allowed to slumber by gas companies who have lately passed from non-statutory to statutory estate; but the letter, in our "Correspondence" columns, by Mr. F. Paternoster, of Felixstowe, revives interest in the matter. The opinion of various legal gentlemen as to the validity of the claim of the Inland Revenue Commissioners to the payment of *ad valorem* stamp duty on the conversion of a non-statutory company to a parliamentary one has not been accepted as final; and something of a more encouraging nature must have arisen for Mr. Paternoster to write that "there now seems some reason to hope that our efforts have not been in vain." Upon this statement, the invitation of our correspondent to companies with whom he has not been in correspondence, but who are interested in the matter, to communicate with him, will no doubt obtain response. If there is a chance of anything effectual being done, then the stronger the representation of aggrieved companies, the greater the hope of success. The non-statutory companies who are promoting Bills in the coming session of Parliament may be interested in going further into the question.

Ratepayers and Gas-Works Purchase.

Already two gas-works purchase schemes promoted by Local Authorities for consideration during the forthcoming session of Parliament have come to an end owing to opposition on the part of the ratepayers concerned. One of these is Hitchin, and the other Aberystwyth. At the latter place, the Gas Directors, on being applied to, stated that the Company had no wish to part with their undertaking, and so would not name a price at which the Corporation could purchase. This meant that, if the ratepayers were bent on acquiring the concern, they would have to do so under compulsory powers, at a price to be fixed by arbitration. This appears to have been the consideration which settled the matter. The proceedings at the public meeting held to consider the scheme showed a pretty general feeling in favour of acquiring the undertaking at a favourable price, if one could be agreed upon beforehand; but there was a unanimous disinclination to bind the town to purchase first, and leave the amount to be paid for settlement by arbitration subsequently. Even a speech by the Town Clerk strongly urging the advantages of municipal ownership failed altogether to shake the feeling of the meeting in this respect; and when the resolution in favour of the promotion of the Bill was moved, not a single person present voted for it.

Incandescent Mantle Litigation in Australia.

Australian papers just to hand contain an interesting report of a judgment delivered the early part of last month in the Supreme Court at Melbourne with regard to a Victorian patent of 1894, owned by the Welsbach Incandescent Company of Australasia, which it was alleged had been infringed by a merchant who had sold and used "Vivid" mantles. But, as it happened, the question of infringement did not have to be decided in connection with the action, though the Judge intimated that, had he found the patent was a valid one, he would have held that there was infringement. One of the issues raised by the defence, however, was that the patent was invalid on the ground of prior publication; and, this being successful, there was, of course, no necessity to come to a decision upon the other points in dispute. The Judge decided that there had been a "public use" of the "material"—the incandescent mantle—in Victoria before the patent was taken out; and that the process by which the mantles were made was also well known to the public, and was the subject-matter of other patents. The only novelty in this instance was the composition of the mantles; and this could easily be ascertained by analysis. In his opinion, therefore, the publication of the "material" was substantially a publication of the invention.

Opposition to the Metre.

An active policy is being pursued by the British Weights and Measures Association in opposition to any attempt that may be made to introduce into this country the metric system. The Secretary, who has lately visited the United States and Canada to ascertain at first hand the opinion existing in those countries on the subject, says that outside a limited circle of scientific professors, chemists, and a very few schoolmasters, there is not only no demand for the metric system, but an active and strong opposition arises whenever there appears any forward movement on the part of advocates of the system to enforce their ideas. He has, however, explained to a representative of the "Standard," that, while his Association are against the metre, they desire to so re-adjust the British weights and measures (which are in universal use in all English-speaking countries, and more or less in all other countries for manufacturing purposes) that they may again enjoy the merit they once had of having their units co-related, and of being operated by systematic multiples. These proposals are intended, while remedying some of the admitted defects of the metric system, to enable decimals or duodecimals to be used at will, whichever the user finds best suited to his purpose. They would have also the merit of being applied gradually, and practically without cost; whereas the metre units must be applied all at once, and at enormous expense. Nothing is to be done in a hurry; but it is the intention eventually to have a conference representative of the various countries, so as to ensure that any proposed reform will be a practical one before it is finally advocated for acceptance.

THE GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 178.)

THE general outlook in the Stock Markets improved last week. There was the fortnightly account to settle, and it was a fairly big one, but happily not occasioning difficulties. Fresh business was nevertheless on a pretty good scale; and in spite of some oscillations, the tendency generally was favourable. The Russian financial situation gave rise to some anxiety, and at one time rather darkened the horizon. But it brightened up again; and this, coupled with hopeful views in regard to some international questions, contributed to instil a cheerful feeling, which lasted up till the close. The Money Market also was not free from fluctuations. Early in the week the supply appeared to be abundant, but later on, just when the demand was stiffening, the gold outlook seemed not quite clear. However, the position was shortly afterwards relieved. Discount rates were firm. Business in the Gas Market showed no improvement in point of activity, and there was no salient incident to engage the attention. But the general tendency was quite satisfactory; and though advances in price were neither numerous nor of any magnitude, yet there was only one receding quotation, and that was in the nature of a swing-back from a previous sharp advance. In Gaslight and Coke issues, the ordinary was fairly active and very buoyant. One parcel was let go on Monday at 103. But this figure was not repeated, and prices steadily stiffened until the final transaction on Saturday marked 104½, but for some reason or another the quotation was left standing at 103-4. In the secured issues, the maximum was done at from 89 rising to 90¼; there were several dealings in the preference at from 110½ to 111½; and the debenture after being dealt in at 88, advanced its quotation a point. South Metropolitan was more active than it had been recently. Marked prices ranged between 132 and 133, but it showed no disposition to rise. The debenture stock was done at 88 *cum div.* and 86½ *ex div.* Nothing at all was done in Commercial capital stocks; but the debenture changed hands once at 85½. The Suburban and Provincial group were just as usual, quiet and strong. Bournemouth "B" changed hands at 17⅝-½, Brentford new at 201½, Lea Bridge at 128, and West Ham at 107¼. South Suburban preference gained a couple of points, with business being done. The Continental Companies were more active, notably Imperial, though it showed a decline in quotation. At the opening, 234 was quoted, but subsequently 231 was marked. Union changed hands at from 129 to 129¾, with an advance of a point in the quotation. European was not dealt in. Tuscan was marked at 9¾ and 9⅝, and Malta at £4 3s. 6d. and £4 8s. 9d. Among the undertakings of the remoter world, Bombay was dealt in at from 6 15/16 to 7⅛, Cape Town at 17½ and 17⅝, ditto debenture stock at 102, and Melbourne 4½ per cent. at 102½. Buenos Ayres marked 12½ and 12⅝, ditto debenture 96, Primitiva ordinary from 7 to 7 3/16, ditto preference 5⅝ and 5 7/16, ditto debenture 97½ and 98¾, River Plate from 12¾ to 12 13/16, and Monte Video 11⅞ and 12 3/16. South African was done at 16½.

The closing prices are shown in our Stock and Share List on page 178.

ELECTRIC LIGHTING MEMORANDA.

Opposition to the London County Council's Electricity Scheme—Electricity in the Daily Press—The South Hants Lead-Poisoning Case—Dublin and an Electrical Expert's Fees.

IT is a satisfactory sign of the times when there are to be found Metropolitan Borough Councils who are not prepared to aid the London County Council in their vague schemes of speculation and lavishness. The Council, much to their vexation, certainly cannot reckon upon more than half the Borough Authorities giving support to their Electricity Bill. Among the dissentients are the Holborn Borough Council, who have given the would-be dictators of Spring Gardens a rebuff that should have good effect among the lesser authorities who follow humbly whithersoever the central Council chose to lead. Having regard to past experience, the Law and Parliamentary Committee of the Holborn Council reported last Wednesday that the County Council was not a suitable body to enter into an undertaking of the nature of electricity supply, more especially as the proposals were to be forwarded against the deliberate advice of their own Finance Committee. Recommendation was therefore made that the opposition of the Borough Council should be of an active nature, involving appearance by Counsel on the Committee stages of the Bill. The report of the Committee was very strongly supported in the discussion—the members objecting to becoming guarantors for any County Council scheme. The opinion was expressed, too, that the latter ought not to have a free hand in going in for these enterprises, and then come upon the ratepayers to make up the deficiency. If all the Borough Councils would stiffen their backs against the usurpation of powers that should be only possessed—if possessed at all by a local authority—by the Borough Councils, the County Council would soon be restricted to their legitimate sphere of activity, which does not include (as a further illustration) the provision of buildings, as is proposed by their General Powers Bill, for the exhibition of works of art, &c., or electric free-wiring powers for the Borough Councils. Some of the electricity supply

Companies and Councils in the West End are not going to allow their businesses to suffer, if the amalgamation of their forces will protect them. A circular has been issued which states that the Notting Hill and the Kensington and Knightsbridge Companies have joined the St. James's and Pall Mall, Westminster, and other Companies, together with the Hampstead, St. Pancras, Hammersmith, and Fulham Borough Councils, in the promotion of the Bill bearing the title of the West London Electric Undertakers' Association Bill, which provides for the linking-up of the bulk supply stations belonging to the respective undertakings with the view to interchange of current. Provision is also being made for a connection with the Metropolitan Electric Supply Company's station at Willesden. It is evident that not a single set of the promoters of the grandiose electricity schemes is going to be allowed a "walk over" in the coming session.

The daily papers have been treating the electricity suppliers of London to some nice free advertisement lately; and one high official of the Charing Cross and Strand Electric Light Company, with a pretty display of studious secretiveness, has told a representative of that organ of light and leading, the "Daily Express," that the electrical companies have a rod in pickle, or something of the kind, for the gas companies. When a man talks like that, it shows that he is not well disposed towards his competitor, and therefore that his competitor is doing better than he. The little piece of harmless brag may therefore pass; it will be quite early enough to give the matter deeper attention when we know the nature of this at present most wonderful and serious secret. The "Globe" has also been paying some attention to the respective merits of gas and electricity for domestic purposes; but for the most part the subject-matter of the article has no particular freshness, and is very disappointing in its inconclusiveness. We wish that writers on this subject would now change their note a little, and, instead of saying that electricity stimulated the gas industry to the making of improvement, would show a knowledge of current events by asserting that the gas industry has stimulated the electrical industry to greater effort. The second point of the "Globe" article is that, even admitting that 6 cubic feet of gas gives as much heat as a unit of electricity, from the hygienic and efficiency points of view, there is something to be said in favour of electricity. Both points of view have their peculiarities. It is said in the article that, in the case of gas, at least 50 or 60 per cent. of the heat goes up the chimney; and therefore we suppose it is intended to be understood that for this reason electricity is to be preferred. But the humorous thing about the argument is that gas can afford to lose so much heat up the chimney, and yet win easily in the competition for heating value with electricity. The fact of the matter is that electricity, as a heating agent, at the narrowest possible price, has nothing that it can afford to lose in the way of calorific power—seeing that, through the roundabout paths of coal, boiler, steam, engine, dynamo, and stove, there has already been some deplorable losses.

But there is the hygienic consideration. Gas-fires seem to be credited by writers favourable to electrical "heating" with some selective ability, which enables them to draw from the air of a room the very things that humanity wants for existence, and leave in the room all that is poisonous and harmful; and the latter has apparently a stubbornness that nothing short of dynamite would dissipate. Let us here suggest to the writer in the "Globe" that—assuming he is correct about his 50 to 60 per cent. of heat lost up the chimney—in the natural order of things that heat does not go up alone, and therefore it must cause a constant and beneficial renewal of the air of a room. There is no such active draught created with an electric radiator; and therefore in a room where this type of heater [forgive the use of the word in this connection!] is used, and where a number of people are assembled, the latter soon have an opportunity, unless special provision is made in the matter of ventilation, of sampling the emanations of each other's respiratory organs. We do not regard that as being a particularly nice "hygienic" condition. There has been all too much braying of trumpets lately over the 1d. per unit that the London electricity suppliers are now prepared to charge for cooking and heating; but the "Globe" writer scores one when he asks where is the justification for charging less for electricity used for cooking than for lighting. The answer that it is used during the hours of light load will not suffice as explanation in London, where householders who will be able to afford to use electricity for cooking—when they can get a reasonably-priced and reliable cooking-stove—have as a rule their heaviest meal prepared during the lighting hours. Seeing there is no restriction in the cooking hours, the "Globe" writer is quite correct in maintaining that the difference between 1d. per unit for cooking and 6d. for lighting is unconscionably great. The electric cooking-stove, however, is admitted to be still in the experimental stage, in which it has been for so many years now, that it is difficult to say precisely when that stage started.

As was to be expected, our friends of the electrical press have taken variously Mr. Baldwin Latham's paper describing a case of lead-poisoning, in the South Hants Water Company's district, due to electrolytic action on a lead water service-pipe causing the deposition of carbonate of lead in the water. The paper and the discussion were printed in the "JOURNAL" for the 2nd inst.; and a comparison of our report with others that have been published will show a writer in the "Electrical Times" that he erred in his carelessly formed conclusion that we "discovered" it in any other place than at the meeting at which the paper was read. Both the "Electrical Times" and the "Electrical Review" have been exercising themselves greatly in an attempt to remove from electricity what naturally they would have people believe is a gross calumny; and a Mr. A. H. Dykes, who seems to be very closely interested in the matter—perhaps he put in the electric lighting installation to which the mischief is imputed—has got quite excited over the matter, and has, in letters to the Press, tried to lay the blame on to the water. But this particular pipe is not the only new lead one that has been laid in the South Hants Water Company's district; and the water supplied throughout the area is similarly treated. There must, therefore, have been some local influence to bring about the trouble. What was it? In a comment by the Editor of the "Electrician" on Mr. Dykes's letter, it is pointed out that "whether serious electrolysis occurred or not, it is evident that an error was committed in allowing the bare return laid to carry the whole of the current back from the house to remain partially insulated. Messrs. Lucas and Pyke's report in the paper states that the resistance between this return and earth was found to be 8 ohms." In our opinion, the thoroughness of the expert investigation made proved the case beyond any manner of doubt. The writers in the two electrical papers first-named, however, think that Mr. Baldwin Latham, the Water Company's Chemists (Messrs. Ogston and Moore), and the Electrical Engineers (Messrs. Lucas and Pyke), were all of them wrong. Against such a complete circle of expert opinion—founded not on superficial evidence, but actual examination and experiment—the whole thing is described by those who did not, and have not, made similar experiment as "a mare's nest;" the "cream of the joke" being found in the fact that the corrosion took place on the inside of the pipe, and not the outside. Direct experiments were made with the same water and a new lead pipe, and also with the same new pipe subjected to the action of an electric current; and the influence of the electricity in producing both corrosion and deposit was proved indubitably—confirming the conditions found in the water and the pipe through which the trouble came. Feeble currents of electricity were found, by the medical man who made the discovery of lead-poisoning, escaping from the tap on the pipe in the cottage where the case of plumbism occurred. How in face of all the facts, and the testimony of the competent experts who made the immediate inquiry into the matter, this serious affair can be described as a "mare's nest" and a "joke," it would be waste of time to try to determine. Why, it may be asked, was this the only case out of the large number of consumers in the district receiving their supply of water from the same source and through lead services?

The Corporation of Dublin have not been able to shake Mr. Robert Hammond off their backs so easily as it seemed they anticipated they would be able to do rather more than six months ago. The Lighting Committee it will be remembered presented to, and the Council adopted, in June last, a draft form of agreement with Mr. Hammond, whereby they thought to terminate that gentleman's retainer dating from 1899, and to absolve themselves from the obligation to place in his hands the carrying out of the extensions entered upon subsequent to June 1—thus avoiding the payment thereon of the usual 5 per cent. But, it will be remembered that, in the summer of last year, Mr. Hammond was seeking diversion at the meeting of the British Association in South Africa; and the agreement remained unexecuted. And so far as we know, it continues unexecuted to this day; inasmuch as Mr. Hammond has a very human fancy for being on the right side of the hedge where money is concerned. There were various items of expenses—some disputed and awaiting to be composed, and others non-debatable. Among the latter items, however, Mr. Hammond included an amount of £830 5s. 2d. for fees upon special reports made from time to time for the Committee's edification in reference to applications for supplies of energy to various bodies and institutions, as well as upon £60,000 worth of extension works which he had reported upon as being necessary to undertake during the period ending Dec. 31 next, and which works the City Electrical Engineer and the local staff are now carrying out. These special reports were charged up on the basis of 1 per cent. However, so far as we understand the matter, the total of Mr. Hammond's final clearing-up bill was £2729 19s. 8d.; and it was this that he apparently wished to have discharged before doing his part in executing a complete release to the Corporation. The upshot is that negotiation and visions of litigation have between them had a mollifying effect; and the Corporation have given their sanction to the parties shaking hands over a compromise of £2250. Seeing that a scheme involving an expenditure of the not insignificant sum of £350,000 has been carried through without litigation, it would have been a pity, for the comparatively (to Mr. Hammond) trifling sum of less than £500, to have had litigation at the end. Now that a final settlement has been arranged, the ratepayers of Dublin will see that the position of Consulting Engineer to the Municipal Electricity Department has not been one without golden recompense for the somewhat distinguished opinions that the occupant of the position found were entertained in respect of himself within the City Hall.

Mr. William M'Landsborough, for many years Engineer of the Cheltenham Water-Works, and whose death was noticed in the "JOURNAL" for Dec. 12, left personal estate estimated to be of the value of £9666.

GAS BILLS FOR 1906.

RESUMING our record of the notable features of the Bills promoted by statutory gas companies, it is seen that interest has by no means been expended by what has already appeared.

It was only last session that the North Sussex Gas Company obtained their Act empowering them to supply gas in the parishes of Billingshurst, Wisborough Green, Slinfold, and Kirdford, in Sussex. The Bill under notice is rather an exceptional one. Gas-works have been erected by the Company on a site more convenient than that referred to in the schedule of the Act of 1905; and now it is asked that the Company may be authorized to maintain the erected gas-works and to manufacture gas on the new land described in the schedule of the present Bill—repealing at the same time the section and schedule referring to the site in last year's Act. The Company desire their limits extended, so as to include a small portion of the parish of Pulborough; and also to be empowered to supply water in their area. The capital powers granted by the Act of 1905, it is proposed to double by this Bill. The style of the Company is, in the event of the water powers being allowed, to be enlarged to the North Sussex Gas and Water Company. [*Parliamentary Agents: Messrs. Baker and Co.*]

The Peterborough Gas Company are taking measures to supplement their present capital, and put that already raised on a uniform basis. In the 1868 Act, the capital was fixed at £20,000; and authority was also given for the raising of an additional £10,000. By the 1874 Act, permission was obtained to the creation of £50,000 additional capital (new "A" shares). This was raised by the issue of 4050 ordinary £10 shares, entitled to a dividend of 7 per cent., and 950 £10 shares, entitled to a preferential dividend of 5 per cent. The Company have borrowed, and now owe, £7500, and have created and issued debenture stock to the amount of £12,500. It is now proposed to consolidate and convert the capital on a 7 per cent. basis. Each holder of ordinary shares entitled to a dividend of 10 per cent. will receive consolidated stock equal to £14 5s. 9d. for every share; each holder of ordinary shares entitled to a dividend of 7 per cent. will receive £10 of consolidated ordinary stock for every share; and each holder of new "A" ordinary shares, £10 of consolidated ordinary stock for every share. Power to raise additional capital to the extent of £80,000 is required. Including the £17,625 already raised, the Company ask to be permitted to borrow up to one-third of the nominal amount of the ordinary stock into which the ordinary capital is consolidated, and one-third on the paid-up additional capital. The Company have scheduled certain additional lands for gas-works purposes, for which they require compulsory powers of purchase, and, in addition, they wish to take 5 acres by agreement. Renewals, insurance, and reserve funds are provided for. The standard price of gas is placed at 3s.; but, for the purposes of the sliding-scale, there is to be a neutral zone between 2s. 10d. and 3s. 2d. Outside these figures, penny variations of price are to carry changes in dividend of 1s. 9d. per cent. in any half year. The excess charges for prepayment supply are on the lines of 10d. per 1000 cubic feet for meter and fittings, 1s. with cooker, and for meter alone 10 per cent. on cost. In regard to the testing of the illuminating power of the gas, a clause provides for the use of "the same apparatus and method as may for the time being be prescribed for testing the illuminating power of gas supplied in London for which the prescribed number of candles is 14, and which is manufactured by the same process." Power is proposed to be conferred on the Directors to determine the salary of the Secretary. [*Parliamentary Agents: Messrs. Dyson and Co.*]

Further capital and other powers are necessitated by the business progress of the Rochester, Chatham, and Strood Gaslight Company. At the present time, the capital consists of 840 "A" shares of £50 each, entitled to a 10 per cent. dividend; 840 "B" shares of £12 10s. each, entitled to a dividend of 7 per cent.; 1029 "C" shares of £3 6s. 8d. each, entitled to a dividend of 7 per cent.; and 1029 "D" shares of £8 10s. each, entitled to a dividend of 10 per cent. The Company have not borrowed any money on mortgage of the undertaking or created any debenture stock. Provision is being made in the present Bill for the conversion and consolidation of these shares into one stock, bearing the uniform rate of dividend of 5 per cent. per annum. The "A" shares will be converted into £84,000 ordinary stock; the "B" shares into £14,700 ordinary stock; the "C" shares into £4802 ordinary stock; and the "D" shares into £17,493 ordinary stock. The division of the consolidated stock among the shareholders will be: For every "A" share, £100; for every "B" share, £17 10s.; for every "C" share, £4 13s. 4d.; and for every "D" share, £17. Additional capital to the extent of £150,000 is asked for. Regarding the consolidated stock proposed to be created, the promoters request authority to borrow £20,000, and up to one-third on the additional capital. The standard price for gas is suggested at 3s.; and 1d. changes in price will carry 1s. 3d. variations in dividend in respect of any half year. The prepayment meter clause provides for excesses of 10d. for meter and fittings, 1s. for meter, fittings, and cookers; and 6d. for meter alone. Insurance, renewal, and reserve funds are arranged for; and the right to purchase up to 10 acres of land by agreement is sought. The title of the Company is to be changed by the addition of "Gillingham" after Chatham, and by the deleting of the word "light." [*Parliamentary Agents: Messrs. Dyson and Co.*]

The progress of the Southampton Gas Company demands more capital and new works. The present capital consists of £344,000 consolidated fully-paid stock, bearing a 5 per cent. dividend, and £200,000 ordinary capital, also entitled to a dividend of 5 per cent., and of which the Company have issued (including premiums) £199,879. In respect of their consolidated stock, the Company have borrowed £70,825, bearing interest at the rate of 4 per cent.; and in respect of their ordinary capital £34,780—leaving the power to borrow a further £15,220 on the ordinary capital. The Company now seek to be invested with power to raise additional capital not exceeding in the whole £350,000, of which not more than half may be issued as preference capital. As borrowing powers, the usual extent of one-third of the paid-up capital is proposed. The dividend on the additional ordinary stock is limited to 5 per cent., and on the preference stock to 4 per cent. Renewals and insurance funds are proposed for authorization; and the extension of the gas-works is duly provided for. The Company are also asking for the repeal of section 44 of the Act of 1898, which will relieve them of the necessity of purifying from sulphur compounds. They desire also to be empowered to purchase by agreement up to 10 acres of land. [*Parliamentary Agents: Messrs. Bircham and Co.*]

In 1902 the South Metropolitan Gas Company were authorized to acquire lands adjoining their then existing East Greenwich works, and were granted the right to use the lands for the manufacture and storage of gas. Exercising these powers, the Company have already effected the acquisition of certain of the lands; but adjacent lands the Company are restricted from acquiring otherwise than by agreement. They need these lands, so as to enable them to make effectual use of those already acquired; and as they have been unable to agree with the owners and persons interested in the property, they now ask Parliament to intervene by authorizing them to purchase and take the further lands compulsorily. The Company also desire that they on the one hand and the Conservators of the River Thames on the other, may be empowered to enter into, and carry into effect, agreements with respect to the construction of gantries by the Company on the bank or foreshore of the River Thames forming part of, or adjoining, the land now proposed to be acquired. [*Parliamentary Agents: Messrs. Dyson and Co.*]

The provisions of the short Bill that the South Suburban Gas Company are introducing are already fairly well known to our readers. It is the measure by which it is hoped that the hard-fought-for reduction of illuminating power to 13 candles will be at length gained. For the testing of the gas, Carpenter's "Metropolitan" argand burner No. 2 is specified, or such other burner as may be prescribed from time to time under the London Gas Act. The burner is to be so used as to obtain, when the gas is consumed at the rate of 5 cubic feet, the greatest amount of light. Harcourt's standard pentane 10-candle lamp is proposed as the standard. Consequent on the decrease in illuminating power, there is to be a change in the standard price and rate of increase or decrease of dividend payable. In connection with the standard price, there has been a neutral zone between 3s. 2d. and 2s. 10d.; and it is proposed that these figures should be altered to 3s. and 2s. 8d. Thereupon, the variations in dividend following reductions or increases of price outside the neutral zone are to be on a 1s. 8d. basis, instead of 1s. 3d., in respect of any half year. [*Parliamentary Agents: Messrs. Dyson and Co.*]

Although the Sutton, Southcoates, and Drypool Gas Company have been in Parliament twice (1873 and 1890) since their Act of 1867 was passed, their capital powers were not enlarged on either of these occasions. In 1867, the share capital was £100,000 in 10,000 shares of £10 each, and entitled to a dividend of 7½ per cent. per annum. The Company were also then empowered to borrow on mortgage £5000. Of this capital there has been raised £99,330; leaving £670 unissued. On mortgage, the full £5000 has been borrowed. The present Bill provides for the conversion and consolidation of the existing shares into one 5 per cent. stock, at the rate of £15 of ordinary stock for every share. The small amount of unissued capital is also to be subject to the scheme of conversion. The amount of additional capital sought to be authorized is £65,000. Inclusive of the £5000 already borrowed, the Company are desirous of power to borrow up to one-third of the nominal amount into which the existing share capital is consolidated, and up to one-third of the additional capital. By half-yearly appropriations, the Company ask to be allowed to establish a renewal fund; and the Directors are to be given power to declare interim dividends without the direction of a general meeting of stockholders. Authorization to purchase by agreement up to 5 acres of land is desired. The condition as to the price to be paid for public lighting embodied in section 61 of the Act of 1867, it is proposed to amend by the insertion of the words "for lighting purposes" after "consumer." [*Parliamentary Agents: Messrs. Martin and Leslie.*]

The Bill of the Tottenham and Edmonton Gas Company is the harbinger of further development in that, of late years, greatly advanced concern. By the Act of 1898, the capital was consolidated and converted into stock of two classes—viz., £120,000 "A" consolidated stock, bearing a dividend at the rate of 5 per cent. per annum, and £250,520 "B" consolidated stock, bearing dividend at the rate of 3½ per cent. per annum. Additional capital was then authorized to the amount of £150,000; and of this the Company have raised £112,853. The borrowing or debenture stock powers amount to £150,000; and of this the Company

have raised £125,000 of debenture stock, bearing interest at the rate of 4 per cent. per annum. They are now contemplating getting powers for what will constitute a complete new scheme of gas-works. The lands that they propose to take for the purpose are described; and the portion is defined upon which they wish to erect manufacturing plant. Among the subsidiary works will be a viaduct or overhead way commencing on the western side of the Great Eastern Railway, in the existing gas-works of the Company, at or near the south-eastern corner of the coal-store and retort-house at the works, and terminating on the western bank of the River Lea Navigation; a subway under the Great Eastern Railway; and the covering in or culverting of a portion of Pymme's Brook in the parish of Edmonton. General powers are also sought for all necessary railway sidings, piers, embankments, and other essential works. In addition to the lands for which compulsory powers are sought, the Company wish to be clothed with the right of acquiring by agreement land to the extent of 20 acres. Additional capital not exceeding in the whole £600,000 is asked for; and it is desired that this may be created and issued as "A" or additional "B" consolidated stock or new preference stock, or partly in one way and partly in the other. Borrowing powers on the usual line of one-third of the additional capital are sought. The Company are also applying for authority to supply power gas; the clause under which they are doing so reading as follows:

> The Company may by agreement with the occupier of any premises within the limits of supply of the Company supply gas to such premises for utilization as power; and the provisions of sections 11 and 12, 24 to 34, 36 and 37, of the Gas-Works Clauses Act, 1871, shall not apply to the Company in respect of gas supplied by them under this section; and the provisions of the recited Acts with respect to the illuminating power or purity of the gas supplied by the Company and the testing thereof shall not be applicable in respect of gas so supplied by the Company or to the Company in respect of gas so supplied. Provided that the Company shall not supply gas under this section for lighting purposes.

Regarding the illuminating power of the ordinary gas, it is proposed to reduce it to 14 candles, tested by the table photometer and Harcourt's 10-candle pentane lamp—the prescribed burner to be of such a pattern (not being an incandescent or similar burner) as shall be the most suitable for obtaining, and in making the test shall be so used as to obtain, from the gas the greatest amount of light. Then the Company also wish it to be enacted that, after the commencement of the Act, they shall not be liable to any penalty or forfeiture by reason of the presence in the gas of sulphur impurities other than sulphuretted hydrogen. The Company are also proposing to amend section 34 of their Act of 1882, in such manner that the interest on the money deposited as security for meters shall be reduced from 5 per cent. to 4 per cent. per annum. [*Parliamentary Agents: Messrs. Dyson and Co.*]

The Uxbridge Gas Company have an up-to-date Bill, in which they desire to give to their capital uniformity and to be empowered, *inter alia*, to construct new gas-works. They have now a fully paid up capital of £47,700, divided into £10 shares. There are 586 original shares, entitled to a maximum dividend of 10 per cent.; 1014 new ordinary shares, entitled to a dividend of 7½ per cent.; 170 new ordinary shares for a converted loan, entitled to a similar dividend; and 3000 new ordinary shares, entitled to 7 per cent. The sum borrowed amounts to £8300. Turning to the clauses of the Bill, the promoters, in the first place, wish to shorten their title of Uxbridge and Hillingdon Gas Consumers' Company to the "Uxbridge Gas Company." The extension of the limits of supply is entertained, by the taking in of that part of the parish of Stanwell in the county of Middlesex which is not included in the limits of supply of the Staines and Egham Company, and several parishes and parts of parishes, not included in the district of the Slough Company, in Buckinghamshire. If, too, at any time the undertaking of the Beaconsfield Gas Company be acquired, the limits are to include the whole of the parish of Beaconsfield and any districts supplied with gas from that Company's mains. Powers are sought for the construction of further works upon scheduled lands; and 10 acres of land is the extent of the powers of land purchase by agreement. As to the conversion and consolidation of the capital into a stock bearing a uniform 5 per cent. dividend, the distribution of the stock proposed is: For each 10 per cent. share, £20 of consolidated stock, for each 7½ per cent. share £15 of consolidated stock, and for each 7 per cent. share £14 of consolidated stock. The additional capital desired is £75,000; but it is provided that not more than £45,000 shall be issued as preference stock. To the offering of new issues to the gas consumers or employees, sanction is asked. The borrowing powers are proposed at the now customary one-third. Insurance and reserve funds are provided for. A sliding scale of price and dividend is proposed, with an initial price of 4s. 6d., and increases or decreases in dividend of 1s. 3d., with penny reductions or advances of price in any half year. Interim dividends it is proposed may be paid without the sanction of a general meeting. The Company intend asking to be allowed to come down to 13 candles in their illuminating power—using for the testing the table photometer, Harcourt's 10-candle pentane, and Sugg's argand for 13-candle gas (the "Wandsworth" test-burner), or such other chimney as may be, upon the application of the Company, approved by the Board of Trade. [*Parliamentary Agent: Mr. R. A. Read.*]

Under the provisions of the Wandsworth and Putney Gas Act of 1900, the Company are subject to certain restrictions with respect to the testing for sulphur compounds; and they have promoted a Bill for the one purpose of securing the repeal of the section referring to the matter. [*Parliamentary Agents: Messrs. R. W. Cooper and Sons.*]

The issued capital of the Watford Gas Company now stands at £14,800 of "A" stock entitled to a standard dividend of 10 per cent., £15,200 of "B" stock, entitled to a standard dividend of 7 per cent., and £28,000 of "C" stock, also entitled to a dividend of 7 per cent. On the sale of the £28,000 of "C" stock, the Company received premiums amounting to £25,364; leaving of the total amount of £60,000 (inclusive of premiums) authorized by the Act of 1883 as additional capital, a sum of £6636, which the Company are empowered to raise. The Company have borrowed on mortgage sums amounting in the whole to £7000, and are authorized under the Act to borrow sums amounting to a further £8000. The "A" stock the Company are now intending to convert into £29,600 of "A" consolidated stock; and the "B" and "C" stocks into £86,400 of "B" consolidated stock. The already authorized unissued capital, it is proposed to issue as "B" consolidated stock to such an amount as, with the premiums that are obtained on the sale, will produce £6636. The additional capital asked for is £180,000, to rank as "B" consolidated stock, to which is to be attached one-third borrowing power. The standard dividend on the "A" stock is to be 5 per cent.; and on the "B" stock, 3½ per cent. On so much of the additional stock as is raised as preference, the dividend is to be 5 per cent. With an initial price of 4s. 3d., there are to be 1s. 3d. increments or decrements of dividend, with penny reductions or increases of price in any half year. In respect of the insurance and reserve funds, the applicable sections of the 1883 Act are to be altered so as to refer to half-yearly appropriations, instead of yearly. An extension of the limits of supply are asked for, so as to include Sarratt and Flaunden in Hertfordshire and Chenies and Latimer in Buckinghamshire. Power to purchase by agreement, or to amalgamate with, the undertakings of the Chesham and Amersham Gas Companies, is desired. Land purchase by agreement up to 10 acres is also requested. The illuminating power of the gas is to be reduced to 13 candles; but the manner of testing is not defined. Power to apply for a Provisional Order for the supply of electrical energy is included. [*Parliamentary Agents: Messrs. Blyth, Dutton, Hartley, and Blyth.*]

The Yarmouth Water-Works Company and the Lowestoft Water and Gas Company are jointly promoting a Bill, which will be dealt with in giving a digest of the provisions of water measures. It is, however, noted that the latter Company have inserted a clause empowering them to supply gas in bulk. For the general purposes of their undertaking, they require power to raise additional capital not exceeding in the whole £100,000. On such part as is issued as ordinary capital, they are limited to a dividend of 7 per cent.; and on such part as is raised as preference capital, to 6 per cent. Borrowing powers are only asked for to the extent of one-fourth of the issued and paid-up capital. [*Parliamentary Agents: Messrs. Sherwood and Co.*]

[The Bills introduced by local authorities will be noticed in next week's "JOURNAL."]

Another Example of Quick Engineering.

Referring to the article and illustration in the last number of the "JOURNAL" giving an example of "lightning engineering" at Chichester, Mr. F. Key, the Engineer and Manager of the Lichfield Gas Company, writes that a similar feat was performed in his works last summer by the telescoping of an 80-feet diameter gasholder in eight weeks; the holder having to be empty only from the last week in May until the first week in August. The work included considerable alteration to the original guide-framing. Mr. Key remarks that these pieces of smart work are well worth recording, especially when one considers the other side of the picture which is occasionally presented in the way of long-drawn-out and dilatory methods of procedure.

Petroleum Production in Canada.

The annual volume of the United States Geological Survey, in reporting on recent developments in the production of petroleum in Canada, remarks that in 1904 the new Leamington field produced 25,241 barrels, which was an increase of about 24,000 barrels over that of 1903. This field is situated near the former natural gas-field in the south-eastern portion of Essex County. The Moore field, situated in Moore Township, Lambton County, is noted for the first time with a production of nearly 37,000 barrels. A well producing twelve barrels of petroleum per day was drilled in Southern Alberta, near South Kootenay Pass. There are numerous natural showings of petroleum and natural gas on the eastern flank of the Rocky Mountains, extending from the United States line to the Arctic Ocean, which in the future will, in all probability, produce large quantities of petroleum.

Mr. Percy H. Hall has been elected a Director of the Croydon Gas Company in place of the late Dr. Adams.

Mr. W. Beacall, the Deputy-Chairman of the Shrewsbury Gas Company, who died on the 6th of November last, left estate of the value of £42,669, of which £25,131 is personalty.

VERTICAL RETORTS FOR THE PRODUCTION OF ILLUMINATING GAS.

A Proposed Setting.

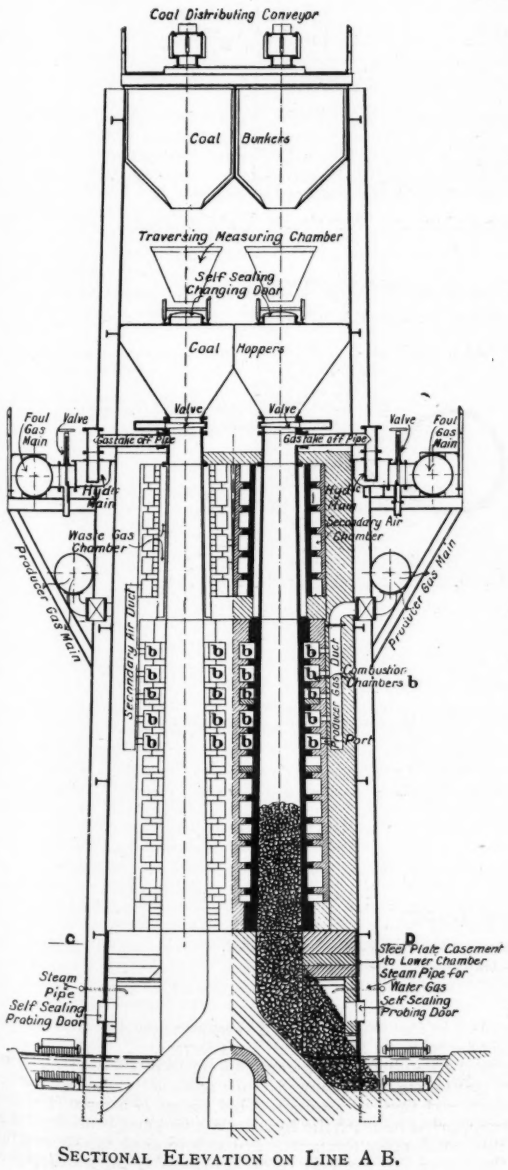
By W. R. Herring, M.Inst.C.E., of Edinburgh.

To the uninitiated, the vertical retort benches in the Scottish oil-works are all similar in design, in the same way that the retort-settings in all gas-works may be said to be alike. But there are, from a technical point of view, differences in design, both in the shape of the retort, its form of setting, the methods employed for charging, and, perhaps more particularly, the methods employed for continuously discharging the spent shale from the base of the retort. In principle, however, they may be said to be alike. Therefore, in dealing with this matter, I have selected a type of retort which appears to me to be structurally best suited for the carbonization of bituminous coal, and have altered its setting so as to meet the requirements of coal-gas manufacture. This retort is known as the "Pumpherston," and is illustrated upon Drawing No. 3.

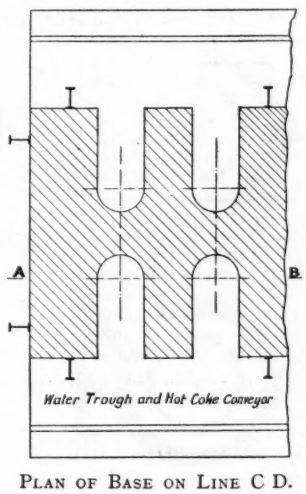
It will be seen from the illustration that the retort is constructed in circular form of specially-made circular-shaped bricks, alternating with one course in every three or four of bricks so shaped as to form a stay or strut between the retort casing proper and the chamber within which the retort is set. The retort is also tapered, being 28 inches at the top and 36 inches at the bottom. It is 20 feet long, and has a cubical capacity of 108 cubic feet. The intervening space between the outer circumference of the retort and the casement of the setting is the area within which the producer gases are consumed and circulated for heating the retort; they being made to descend from the upper to the lower portion of the retort in an elongated spiral flow to the base, where each retort discharges into a chimney or flue common to four retorts, which may be divided or not, ascending to the level of the top of the fire-clay retorts, where it is divided into four channels and made to circulate between the outer casement of the upper or iron portion of the retort and the fire-brick casement dividing the secondary air chamber from the outer casement of the bench—Drawing No. 2. The flow of the products of combustion is controlled by dampers to each quarter section on leaving the top part of the setting and collected into a main flue, or by means of individual chimneys discharged into the air.

The fire-clay retort is, as already stated, 20 feet long, and the iron portion 10 feet; the latter having a cubical capacity of 35 cubic feet. There is then the neck, with the cut-off valve intervening between the mouth of the retort and the coal-storage hopper—the valve being closed at such times when the hopper is being recharged with coal. When it is found impossible to close the valve, this fact alone indicates that a fresh supply of coal is not required in the upper hopper; so that at no time is it necessary to open the self-sealing door of the upper hopper until the communication between the retort and the outer air has been closed by the valve. The total cubical

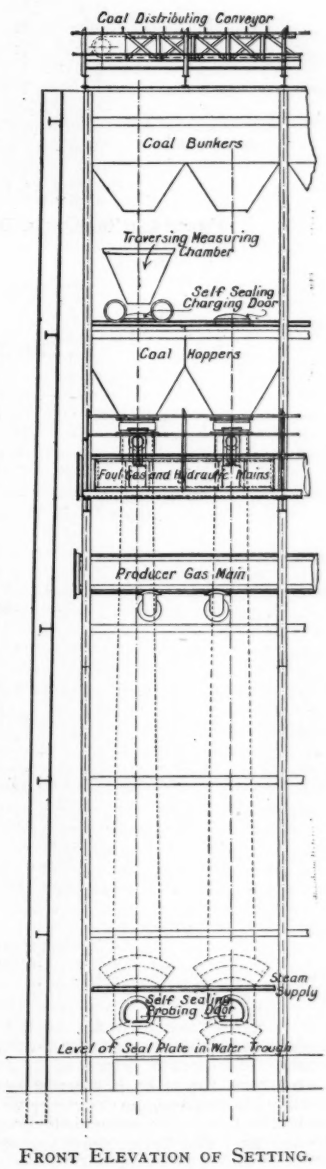
Drawing No. 1.—Herring's Proposed Vertical Retort-Setting for the Simultaneous Production of Coal and Water Gas.



Sectional Elevation on Line A B.



Plan of Base on Line C D.



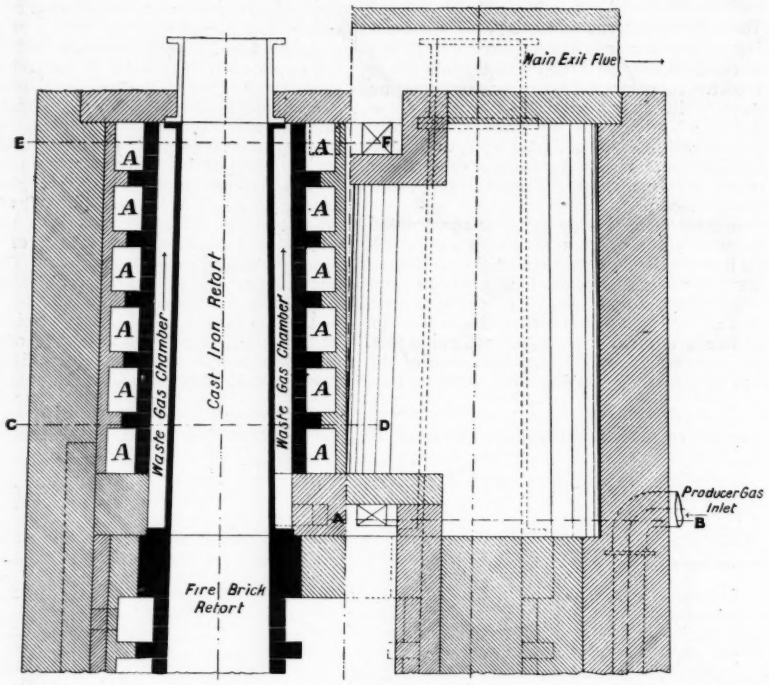
Front Elevation of Setting.

capacity of the iron and fire-clay retort combined, so far as its active carbonizing capacity is concerned, is therefore $3\frac{1}{2}$ tons.

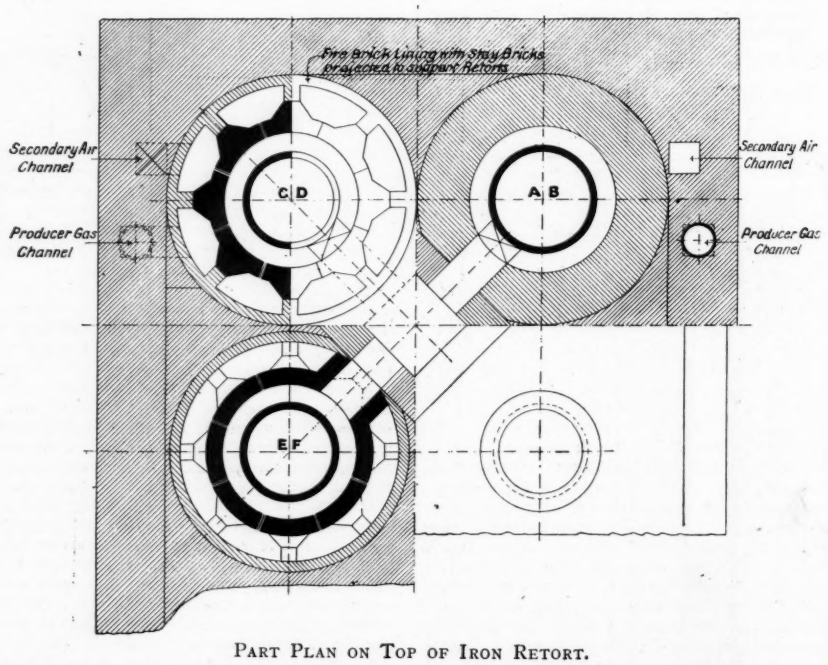
Many are the devices used in the oil-works for extracting the spent shale from the base of the retorts. As this material consists of a small, slaty residue, however, it can be easily dealt with mechanically and in a way which the residue from bituminous caking coal would refuse to respond to; and considerable modification will be necessary to make this portion of the setting a success. Upon the General Drawing No. 1, I have shown an arrangement which provides an inclined plane at the base of each retort, of larger area than the lower part of the retort, so that as the contents of the retorts descend, they are directed outwards, through an opening in the casement into the water-trough at the base—the water forming a seal as well as playing other important parts. At the point where the coke is discharged, a coke-conveyor is arranged to carry it away automatically—not only such of the coke as floats on the water surface, but also such portions as sink to the bottom of the trough. An ordinary self-sealing mouthpiece is provided above this aperture, in a position where the coke is already quenched; so that should any choking take place, the door may be periodically released for a few moments without necessarily interfering with the working of the setting. The shale retorts are usually grouped in fours in a bench of any number of sets. I have, therefore, followed the same policy in this respect, and will now proceed to describe the method of working a bench such as is shown.

The heat applied for the process of carbonization must, in the case of gas-works, be obtained from separately-worked outside producers, and the gas conducted by means of a main (which is shown supported beneath the hydraulic main) and branches taken therefrom conducting the producer gas into channels descending from the top of the fire-clay retort downwards for a distance of

DRAWING NO. 2.



ENLARGED SECTIONAL DETAIL OF IRON RETORT AND WASTE GAS AND SECONDARY AIR CHAMBER.

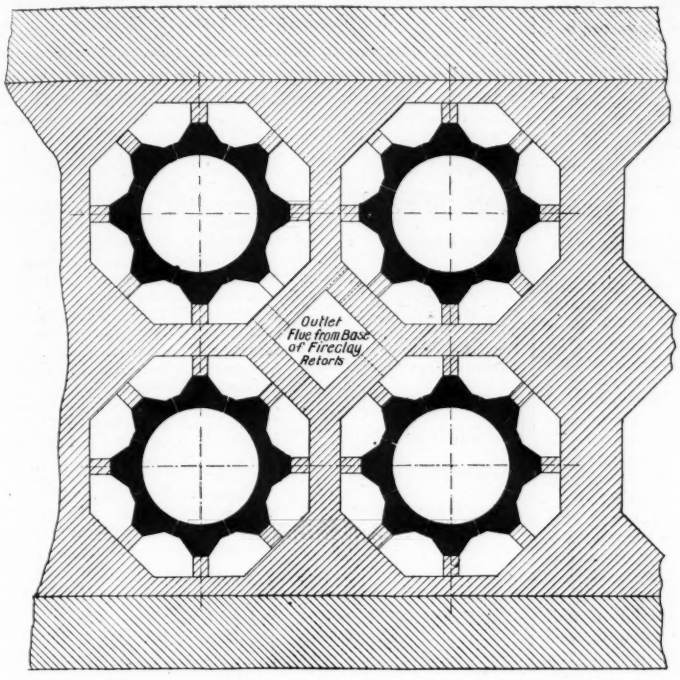


PART PLAN ON TOP OF IRON RETORT.

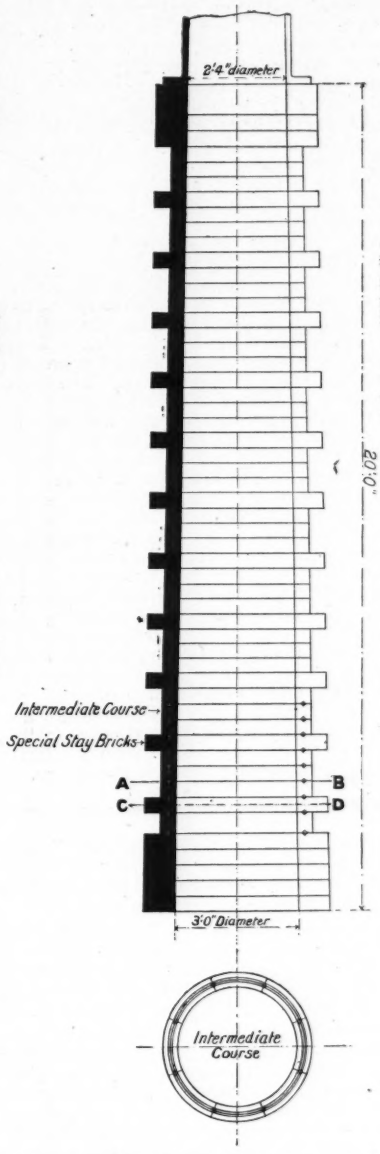
A B—Part Plan on Line A B, showing Entrance from Upright Flue to Waste-Gas Chamber.
C D— ,, ,, C D, through Stay Bricks forming Secondary Air Chamber.
E F— ,, ,, E F, showing Outlet from Waste-Gas Chamber to Main Flue.

The heat applied for the process of carbonization must, in the case of gas-works, be obtained from separately-worked outside producers, and the gas conducted by means of a main (which is shown supported beneath the hydraulic main) and branches taken therefrom conducting the producer gas into channels descending from the top of the fire-clay retort downwards for a distance of

DRAWING No. 3.



PLAN OF SETTING ON LINE C D (WITH RETORTS SHOWN IN SECTION) THROUGH STAY BRICK COURSE.



VERTICAL SECTION AND SECTION ON LINE A B.

about one-third, or perhaps to one-half, its total length, and discharging, by means of ports, into the chamber intervening between the retort and the casement of the bench. The secondary air is obtained by it being admitted into the secondary-air chamber shown on Drawing No. 3, which is an annular space surrounding the flue encircling the iron portion of the retort. The secondary air is made to descend in a similar channel to the producer gas, and, by means of similar ports, comingles with the producer gas in the chamber surrounding the retorts. The products of combustion so formed are made to descend, by means of baffle-bricks, in an elongated spiral form to the base of the retort.

The reason for bringing about combustion around the upper part of the fire-clay retort is based on the theory that the coal, after being partially prepared for carbonization in the iron portion of the retort, first descends into the upper part of the fire-clay retort. It is at this stage that the greatest activity prevails, and, consequently, the greatest absorption of heat takes place. As the charge descends, it is more or less spent, and by the time it reaches the bottom is completely so, and in the condition of an incandescent mass at a high temperature, ready for treatment for the recovery of ammonia. It is as well to state at this stage that the method of heating, and also the jacketing of the iron portion of the retort with the waste gases so as to heat the secondary air, differ completely from what is practised in the shale-oil retorts in Scotland, and is really what I am of opinion would be one of the best ways of treating a setting such as has been described for coal-gas manufacture. This will be more particularly referred to in a future article.

Let me assume for a moment that such a bench of retorts is to be brought into work. The retorts are primarily heated by direct firing within the retort itself, by first charging it with coke to about half-way up the fire-clay portion—the coke so charged being ignited at the base, and an air supply admitted to assist the combustion, the top valve and the cover on the coal-hoppers being opened. As soon as the retort is sufficiently heated to make it safe to admit producer gas into the combustion chamber surrounding the same, producer gas is admitted, together with the secondary air supply, and the ordinary process of heating is gone on with. When a carbonizing temperature is reached, the ash produced by the direct combustion within the retort must be removed, and the retort filled up with sufficient coke to form the bed upon which the coal is to rest. Thereafter the retort, including the iron upper portion and the hopper, would be fully charged with coal in the ordinary way, and the outlet-valve on the gas take-off pipe leading to an ordinary type of hydraulic main opened, and whatever vacuum might be found necessary maintained in this main and, consequently, in the retort. We must further assume that the dead coke put into the retort to form the base upon which the charge is to rest has also been removed as the process of carbonization advanced, and that the coal has now assumed its normal position within the retort—that is to say, that red-hot coke has already descended into the lower chamber beneath the retorts, and that the process of carbonization is normally proceeding in the fire-clay retort above. With such an arrangement, there will consequently be several distinct stages of the process proceeding simultaneously, each of which is of considerable importance to the other.

Let me first deal with the coal gas. The coal in the vicinity, or (say) in the upper half of the clay retort will be in a rapid process of distillation, and its completion more or less active as it descends. The resultant gas will ascend, passing through the coal in the iron portion of the retort, which itself is externally heated by the waste heat after leaving the base of the fire-clay retort-setting, and has consequently very nearly approached the carbonizing stage. It will also act as a filter, and retain within the retort volatile matters which would otherwise condense out as fluids were they to make their escape from the retort without this intervening mass. The gases generated in the lower portion of the fire-clay retort will be of a much poorer quality, of less volume, and necessarily hotter, than in the upper portion of the retort, where the active distillation is taking place. These poorer gases, including the water gas formed at this stage, will consequently enrich themselves at the expense of the richer gas and the lighter hydrocarbons yielded in the upper portion of the retort, and such as may be deposited in the material in process of preparation for carbonization in the iron portion of the retort in passing through the charge.

The charge of coke in the bottom of the retort and in the lower chamber will be in a highly incandescent state, free of all volatile matters such as we know it to be at the expiry of the ordinary carbonizing period. The heat thus present in the spent charge, and which is now utterly lost, is to be, in this case, utilized for the production of water gas; steam being admitted in just such quantities as will absorb the whole of the heat, and

render the coke ready for displacement at the base, quenched and practically cold. The process of the withdrawal of coke and the charging of coal being continuous and automatic, the water gas so formed at the base of the retort will still have the full length of the incandescent retort to travel through in the presence of its carbonaceous contents; and it will thus ensure its conversion into a permanent gas. Whether by this means of producing water gas with a limited quantity of steam we shall attain the same results as are obtained in the oil works—where, by the use of a liberal quantity of steam at the base of the retort, they are enabled to recover very greatly increased percentages of the nitrogen as ammonia originally contained in the shale—is a matter of considerable importance, and one which I propose to deal with in the next article.

Generally speaking, the construction of the bench is very similar to the shale settings in Scotland; and the adaptations are merely such as, in my opinion, may be the correct ones to adopt in order to adapt them to the requirements of coal-gas manufacture. It will be seen that I have introduced the continuous coal-storage hopper above the bench, which is fed by a continuous conveyor; the whole being supported upon the superstructure of the bench. The continuous storage hoppers are made to feed into traversing measuring chambers, whereby the quantity of coal charged to each retort can be accurately recorded. The movement of the charge of coal from the top to the bottom of the retort, and its efficient carbonization, will not, I think, present any difficulties. In the first place, the retort is substantially tapered. The natural movement of the material within it is thus for the contents in the centre to sink, with the natural result that portions of the charge at the sides ultimately fall into the centre—the charge as it were continually rolling upon itself, from the surface of the retorts inwards to the centre, in the same way that grain, or even coal, discharging from a hopper with an outlet at the base. On first opening the discharging aperture, the coal, like grain, draws down the central axis over the opening, and feeds itself from the upper layers rather than from the lower layers immediately in the vicinity of the opening; and the enlarging diameter of the retort as the charge descends will assist in this motion being fairly uniform, and thus insure a constant change in the position of the charge in relation to the active heating surface of the retort—the circular form of retort aiding greatly to the constantly changing position of the charge.

At a meeting of the Council of the Chartered Institute of Secretaries last Wednesday, Mr. Frank G. Vivian, Gas Engineer, of Llanelly, was duly elected a Fellow of the Institute, and a certificate of membership was granted him.

The youngest daughter of Colonel Sir William T. Makins, Bart., of Rotherfield Court, Henley-on-Thames, the Governor of the Gaslight and Coke Company, is (according to the "Morning Post") engaged to be married after Easter this year to Mr. Walter W. Parish, of Ennismore Gardens, W.

A Submerged Pipe for the Passaic Water Company has recently been laid, according to "Engineering Record," in what is believed to be the shortest time known. The pipe is 43 inches in diameter, and is made with the lock-bar joint, manufactured at the shops of the Contractors (the T. A. Gillespie Company) at Paterson, N.J. The river at this point is about 330 feet wide, with a maximum depth of about 3 feet and a moderate current. A double row of 2-inch hemlock sheet piles with square edges was driven on either side of the centre line of the pipe, penetrating to firm soil under a bed of quicksand, 2 to 3 feet thick, which was unexpectedly encountered. An excavation 7 feet deep was made between the sheet piles from one shore to the middle of the river; and the water was kept out by two 6-inch plunger pumps. The pipe was riveted up in position and back-filled; the same operations being conducted on the other half of the crossing. During the laying of the pipe there was a 3-feet freshet; but the work was accomplished in about six weeks, and within the contract price. It was considered that the results were somewhat exceptional for work done in quicksand and subject to freshets, where only hemlock sheeting without covered joints was used.

A feature of municipal ownership which has been apparent for many years—the unwillingness of public officials to charge all fixed expenses against public plants—is emphasized in some recent proceedings before the Massachusetts Gas and Electric Light Commissioners. Three years ago, the authorities of the city of Haverhill bought the local gas and electric plant for $29,252, and have since spent $267,723 on it for additions and improvements—a total of $1,096,975, mostly raised by the sale of 3½ per cent. bonds. The estimated expenses for 1906 are: Operation, $230,870; interest, $28,105; redemption of bonds, $36,600; depreciation at 5 per cent., $54,840—total, $350,415. The estimated income is $228,000, leaving $122,415 to be raised by taxation. If from this total deficit the $36,600 for bond payments is de ducted, there remains $85,815 to be raised by general taxation to meet the running expenses of the works. The City asked the Commission to relieve it of this obligation, claiming that it was unnecessary and unreasonable in the case of public ownership. The Commissioners unanimously declined; refusing to see in municipal ownership any special grace or financial licence absolving the authorities from the exercise of business principles.

THE INSTITUTION OF GAS ENGINEERS.

New Members and Associate Members.

We are informed by the Secretary (Mr. Walter T. Dunn) that the following gentlemen have recently been elected members or associate members of the Institution of Gas Engineers.

Members.

Browne, Frank	Manager, Gas-Works, Tuam, Co. Galway.
Donegan, Laurence	Manager, Corporation Gas-Works, Drogheda, Co. Louth.
Hoare, Harry Herbert	Engineer and Manager, Falmouth Gas Company.
Lewis, John	Distribution Superintendent, Newcastle and Gateshead Gas Company.
Milne, Samuel	Engineer and Manager, Corporation Gas-Works, Aberdeen.
Naylor, Joseph S.	Engineer and General Manager, Corporation Gas-Works, Rotherham.
Nicholls, William	Manager, Penzance Gas Company.
Tiplady, Thomas Warwick	Manager, Urban District Council's Gas-Works, Bakewell.
Tooley, George William	Manager, Corporation Gas-Works, Rochdale Road, Manchester.
Webster, John	Manager, Glasgow Corporation Gas-Works, Provan.
Wentworth, Joseph	Engineer and Works Manager, Gas and Water Works, Aldershot.
West, John Frederick	Manager, Stamford and St. Martin's (Stamford Baron) Gaslight and Coke Company.

Associate Members.

Carpenter, W. Stanley	Assistant Manager, Gas-Works, Dorking.
Clarry, Reginald H.	Assistant Engineer, Gaslight and Coke Company, Beckton, E.
Frith, Ernest	Assistant to Engineer, Gas-Works, Runcorn.
Johns, William H.	Engineering Assistant, Gas-Works, Bath.
Prince, R. S. P.	Engineering Assistant, Gas-Works, Aldershot.
Shadbolt, Samuel	Resident Engineer and Manager, Kirkby-in-Ashfield Urban District Council's Gas Undertaking.

GAS-ENGINE INSTALLATIONS IN SHEFFIELD.

In the Engineering Supplement to "The Times" last Wednesday, particulars were given of some recent installations of gas-engines by Messrs. Osborn and Co., of Sheffield, which present several features of interest, inasmuch as they are examples of the introduction of the most modern form of gas-engines to replace steam. At the firm's Wicker works, they have set up bituminous coal-gas producing plant by Crossley Bros., Limited, the main feature of which is the production of a clean gas by means of a centrifugal tar-separator. When the gas has passed through the coke scrubbers, it is drawn through this separator, into which are introduced two small jets of water. The vanes of the separator throw the gas and the water into motion; and the water, finely divided, picks up the tar, which is sent out to the rim of the separator by centrifugal force, and drawn into the tar-well. After passing through the separator, the gas goes through the sawdust scrubbers to be further cleansed and dried. In the power-house the firm employ a gas-engine of an entirely new type—a three-cylinder vertical engine of 200 brake-horse-power, with pistons 15½ inches in diameter by 19-inch stroke, coupled to a 120 kilowatt compound-wound electric generator by Bruce Peebles and Co. The engine works on the "Otto" cycle; and the supply of gas is regulated by a centrifugal governor, and not on the "hit-and-miss" principle, so that there are three impulses in two revolutions. They have also put down a Tangye horizontal gas-engine of 70 brake-horse-power, with pistons 16½ inches in diameter and 2-feet stroke, driving a 35 kilowatt compound-wound electric generator by Peebles. Additional outlay has been incurred at the Wicker works through the replacing of an old beam engine by a horizontal gas-engine of 125 brake-horse-power, with pistons 22½ inches in diameter and 28-inch stroke. At the Brook Hill works, the firm have put down a Crossley horizontal gas-engine of 130 brake-horse-power, with piston 20 inches in diameter and 30-inch stroke, and also a Fielding and Platt horizontal gas-engine of 80 brake-horse-power, with pistons 90 inches in diameter and 20-inch stroke. At the Rutland works, they have put down a duplicate of this latter type of engine and of the vertical engine at the Wicker power-house. At the Rutland works, they have for a number of years had a supply of gas from the Siemens furnaces; but when they decided to replace the steam-engines by gas-engines, they found it necessary to devise some means of cleaning the furnace gas, which was, of course, too impure for the engines. Messrs. Crossley were able to erect suitable plant for doing this work, and now the engines are being run from the Siemens gas supply.

The students of the Institution of Civil Engineers will to-morrow visit the works of the South Metropolitan Gas Company in the Old Kent Road.

THE PROGRESS OF GAS SUPPLY IN PARIS.

[Second Article.]

In the preceding article (*ante*, p. 90), we brought our sketch of the progress of gas supply in Paris down to the time when the Company were fairly at work under their Treaty of 1855. They did not, however, go on long undisturbed. In 1860, Paris was extended by the inclusion of the portion of the environs of the city lying between the old outer boulevards and the fortifications; and this necessitated a fresh Treaty with the Company. The zone referred to had been served partly by them and partly by the Northern and Eastern Companies. The Batignolles, Montmartre, La Chapelle, and Clichy were lighted by the Northern Company, who also furnished a supply of gas to St. Denis. Charonne, St. Mandé, and Bercy obtained their gas from the Eastern Company, who also lighted Charenton, Maisons-Altfort, and St. Maurice. These Companies relinquished all their rights and interests to the central Company, who then became responsible for the lighting of the whole of Paris. As the changed conditions necessitated additional manufacturing plant and extensions of the mains into sparsely populated districts, the Company asked for certain privileges, which were conceded by the Treaty of Jan. 25, 1861. Under the new arrangement, the City acquired a financial interest in the lighting of the annexed zone. In the event of loss, the annual deficits were to be allowed to accumulate, at 6 per cent. interest, till 1872, when the authorities were to apply to the repayment of the debt the share which would come to them of the Company's profits. The Treaty of 1855, it may be remembered, stipulated that the division of profits was not to commence until 10 per cent. had been earned on 55,000,000 frs. of capital. In view of the works which would be necessary for lighting the added area, the Company were authorized to increase their capital to 84,000,000 frs., and, before sharing the profits, to deduct the sums necessary to redeem the shares and bonds already issued, or which would be issued, as well as to maintain the reserve at 2,000,000 frs. The article of the Treaty regulating these matters set forth that as, at the end of the concession, all the shares and bonds would have been redeemed, "the produce of the movable and immovable assets of the Company and the amount of the reserve were to form part of the profits to be divided." Article 51 of the Treaty of 1855, relating to the works and mains, as amended by the appendix, was kept intact; but it was specified that the amount to be paid as rent of the subsoil should be increased to 250,000 frs. as soon as the consumption of gas per metre (3·28 feet) of main in the added area should be equal to that in Paris. Finally, two points which had not been sufficiently emphasized in the former Treaty were made more explicit in the interests of the City. The first related to the illuminating power and purity of the gas, which were to be tested in accordance with the instructions of Dumas and Regnault; and the second put upon the Company the obligation to drain those of their pipes which were laid under thoroughfares planted with trees, conformably to the rules laid down by the Administration. The Treaty of 1861 would, it was evident, bring about an increase in the consumption of gas, and consequently of the *octroi* duty of 2 c. per cubic metre, which was to go into the Municipal Exchequer. But the Company were not to be called upon to lay down more than about 100 miles of mains between the date of the Treaty and Dec. 31, 1872; and they had the right to substitute for the tax of 2 c. just referred to a duty on the quantity of coal carbonized.

Difficulties soon began to arise; and as the City was very desirous to participate as early as possible in the Company's profits, and at the same time satisfy the numerous demands of the consumers in the added area for extensions of mains, it became necessary to draw up a new Treaty. The one dated Feb. 7, 1870, was the result; and under it the Company worked till the end of the term. It abolished the difference between the old and new areas established by the preceding Treaty, except in regard to the rental of the subsoil; but it was specified that the additional 50,000 frs. should not be called for by the City until the consumption reached 148 cubic metres (5225 cubic feet) per metre run of main. This it has never done. It also specified that the *octroi* duty of 2 c. per cubic metre of gas should be levied only upon the quantity consumed. With regard to the important question of the mains, the City had the right to call upon the Company to lay about 500 yards daily; all thoroughfares 14 metres (46 feet) and upwards in width to be provided with two pipes laid under the pavements. The Treaty modified the clause in its predecessor bearing upon the division of profits, and gave the City the right to share them as from Jan. 1, 1869, after deduction of the amounts necessary for the sinking fund and for maintaining the reserve, and of the sum of 12,400,000 frs. (£496,000) up to the year 1887 inclusive, and 11,200,000 frs. (£448,000) from Jan. 1, 1888, to Dec. 31, 1905. An important change was made in the article in the two preceding Treaties bearing upon the possession by the City of the works and plant at the end of the concession, by the omission of the clause as to the price to be paid for the works being determined by experts. The proper reading of the new article was the subject of a serious dispute, which was eventually settled by the Courts adversely to the Company, who had, as the result, to pay over considerable sums to the Municipality.

The terms of the Treaty of 1870 were at first highly appreciated by the City and the Parisians, more especially by the former, who had the gratification of seeing their rights and interests in the gas undertaking bringing them in a revenue which increased from 7,678,922 frs. in 1869 to 11,201,770 frs. in 1875. Subsequently, however, the consumers began to think they were paying a very high figure for their gas. Before the Treaty of 1855 was signed, a Commission was appointed to determine the net cost of gas, after allowance had been made for the value of the residual products. It was composed of four members of the Institute of France—MM. Regnault, Chevreul, Morin, and Peligot—who had small works put up at Sèvres, where they carried out a series of experiments. The conclusion they came to was that the cost price of gas, at the works, was 2 c. per cubic metre, or about 5½d. per 1000 cubic feet. The Company declined to accept this figure, and submitted against it that of 7·91 c. arrived at by their officials. But whatever was the net cost of gas, the consumers began to think that the selling price was anything but reasonable. This discontent was caused to a large extent by a contemplation of the condition of things on this side of the Channel; and the article of the Treaty which fixed the price of gas at 30 c. and 15 c. per cubic metre respectively for private and public lighting was coming to be regarded as a not unmixed blessing. It will be remembered that provision had been made for the appointment of a quinquennial Technical Commission to investigate any new processes of gas manufacture which would be calculated to effect economy from which the consumers might benefit. The first period, however, was allowed to expire without any such inquiry as that indicated being set on foot. This omission did not pass unnoticed; and it was evidently determined that this should not occur with the second period. In 1879, the Municipal Council had presented to them, by 28 Syndical Chambers, and more than 2000 consumers, a petition for a reduction in the price of gas. The result of this action was a demand by the Council for the appointment of a Technical Commission; and it was duly nominated by the Minister of the Interior. Nothing came of it, however, for the Commissioners decided that in the manufacturing operations of the Company there was no new process or system in use in 1880, as compared with 1870, of a character to allow of a material reduction in the price of gas. This conclusion gave rise to so much dissatisfaction, that the new Prefect of the Seine (M. Hérold) had a mixed Commission constituted, with instructions to formulate some scheme. This was done, and a report was presented by M. Martial Bernard to the Municipal Council, who had it under discussion on Jan. 3, 1881. The Commission proposed a prolongation of the Company's concession by forty years, with successive reductions in the price of gas—from 30 c. to 25 c. per cubic metre from 1881 to 1883, and further reductions from Jan. 1, 1885, in the shape of a division of profits between the Company and the consumers. No decision was come to upon the report, as the dissolution of the Council was approaching. In the subsequent election speeches, the gas question figured prominently; and a decided feeling was manifested against M. Bernard's proposals. The effect was shown at the polls; for he failed to secure re-election. Under these circumstances, his scheme was rejected by the Administration.

The agitation, however, once started, was not allowed to subside. The subject was taken up again in the spring of 1882, when the new Prefect of the Seine (M. Floquet) was requested to negotiate with the Company with the view of obtaining an immediate reduction in the price of gas, and, if necessary, to order it to be made. He accordingly put himself in communication with the Company; and the following scheme was the result: An immediate reduction in price from 30 c. to 25 c. per cubic metre for gas used for lighting, and to 20 c. for that employed in the production of power; as from Jan. 1, 1886, the profits in excess of 39,750,000 frs. to be devoted to further reductions; the Company's concession to be prolonged forty years; and the City's rights in regard to the plant to be secured. The discussion of these proposals was commenced by the Municipal Council on Aug. 9, 1882, and adjourned. Meanwhile, the Company agreed not to ask for more than 27 years' prolongation of their concession. The Council, however, would not listen to their proposal, and rejected the whole scheme on Feb. 22, 1883. They then asked the Prefect of the Seine to issue an order upon the Company to reduce the price of gas to 25 c. per cubic metre for private consumers, and to 12·5 c. for public lighting, and to take the necessary steps to enforce it. A decree in these terms was accordingly drawn up on March 21, 1883. The Company thereupon submitted the question to the Prefectorial Council, and subsequently to the State Council; the outcome being that the latter called upon the former to revise their decree. Then the whole matter dropped, as the Prefectorial Council decided, on July 4, 1884, that no reduction in price could be called for. Quinquennial Technical Commissions were held in 1885 and in 1890; but they came to a similar conclusion from the point of view of the adoption of new manufacturing processes in terms of the Treaty. It was acknowledged by the later Commission that the Company had been experimenting with the Coze system of inclined retorts; but while they recognized its value as a labour-saver, they declined to express an opinion as to the economy likely to result from its use. Consequently, they did not think they could call upon the Company to adopt it permanently.

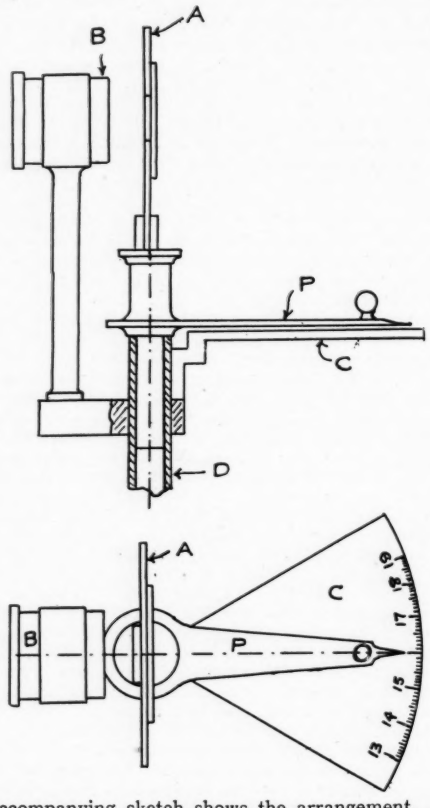
In the next article, we shall trace the further progress of the gas question down to the relinquishment by the Company of the sole control of the supply at the close of last year.

AN IMPROVED PHOTOPED FOR THE TABLE PHOTOMETER.

By Robert Hayes Collins.

In the issue of the "Journal" for the 19th of December, there appeared a paper by Mr. J. G. Clark, given at a meeting of the London and Southern District Junior Gas Association, on "Some Modifications of the Harcourt Table Photometer." The author proposed to move the photoped of the table photometer so that the distances of the two lights from the photoped paper varied, while the angles of incidence of the lights on the paper remained equal. A better arrangement would be one in which the distances remain constant, and the necessary adjustment of illumination on the photoped paper was obtained by a variation of the inclination of the beams of light.

Following up this idea, the writer has devised a photoped which has been constructed and used at the Old Kent Road Gas-Works, in which the plate carrying the paper is made to revolve on a fixed vertical axis which coincides with the line of demarcation of the two lights on the paper. The tube carrying the slot is fixed independently of this revolving part, and remains stationary.



The accompanying sketch shows the arrangement. A is the plate carrying the photoped paper; B, the tube carrying the slotted diaphragm; C, the quadrant on which the pointer reads; D, the pedestal fixed to the table; P, the pointer attached to A.

Supposing the standard is fixed at 1000 mm., and the argand at 1265 mm. The central position of P (bisecting the angle between the two rays of light) would then read 16 candles. Also for a variation from the central position through an angle the reading would be

$$16 \times \frac{\sin(\theta - \alpha)}{\sin(\theta + \alpha)}$$

α being + in clockwise direction, and − in anti-clockwise direction; and θ being the angle between either beam of light and the paper, when P is in the central position. For the standard table photometer as it now stands, $\theta = 78° 28'$.

From this simple formula the scale for the quadrant can be set out, or, if preferred, the quadrant can be calibrated by using the existing table photometer.

There are two objections to the method, neither of which has up to the present proved worth noticing. The first is that, in rotating the paper, one side comes nearer to the light than the other; and consequently the paper is not equally illuminated. The difference, however, cannot be discerned in practice. The second is that the two beams thrown on the paper are not always of equal width. This also does not interfere with the reading.

The writer is now experimenting with this photoped, which so far promises to be an improvement on the present system of the moving argand. The limits appear to be about 12 to 19 candles; but this can be altered by choosing a different distance from the argand to the photoped.

EFFECT OF HUMIDITY ON THE PENTANE LAMP.

The above subject was dealt with in an appendix to the report of the Research Committee of the American Gaslight Association, which was submitted at the last annual meeting; the author being Mr. J. B. Klump, the Inspecting Engineer of the United Gas Improvement Company of Philadelphia. The object was to present to the Association a means of comparing photometric standards or other lights represented by open-flame burners, such as the pentane lamp, candles, &c., with vacuum electric standards, or such lights as are not affected by varying conditions of the atmosphere. The author points out that the effect of atmospheric conditions upon open-flame standards has been studied by various authorities for some years; but the first authentic treatise on the subject was the paper presented to the German Association of Gas and Water Engineers in 1895 by Dr. Liebenthal, of Berlin, who gave the results of his readings on the Hefner unit and the one-candle pentane lamp; showing the effect of moisture, barometric pressure, and the presence of carbonic acid in the air on the light-values of these lamps.* Mr. C. C. Paterson, of the National Physical Laboratory, conducted a series of experiments on the ten-candle pentane lamp, determining the variation for moisture and barometric pressure, and laid the result before the British Association in 1904.† The constants for this lamp agree closely with those obtained by Dr. Liebenthal; showing that the law had been closely defined by each.

The general subject dealt with by Mr. Klump was brought before the Association in 1900 by Mr. Rollin Norris, in a paper presented through the Research Committee.‡ The experiments conducted by him gave results approximating those of Mr. Paterson; but time at his disposal was so limited that the number of readings made was hardly conclusive enough to establish a definite law of variation. On the basis of the constants arrived at by Mr. Paterson, as the results of some months of most careful work, Mr. Klump constructed several curves which are given in his paper. They show that the light is affected by the three conditions of the atmosphere already mentioned—viz., the presence of carbonic acid, barometric pressure, and moisture. On these points, Mr. Klump makes the following remarks:—

The variation of the lamp for carbonic acid present is practically negligible, and for all intents and purposes may be omitted in the commercial readings. Dr. Liebenthal determined the variation of the Hefner lamp to be only 0·7 per cent. for each litre of carbonic acid present per cubic metre, or one part of carbonic acid in 1000 parts of air. According to Kent and other authorities, pure country air contains only 4 parts in 10,000; while the maximum amount allowable for good ventilation should not exceed 8 or 10 parts in 10,000, and the quantity in a well-ventilated photometer-room should not exceed 20 parts in 10,000. Hence, under ordinary conditions, the variation in lamp value should be less than 0·7 per cent., and seldom as high as 1·4 per cent., due to the presence of carbonic acid in the air. Then, with good ventilation, no correction for carbonic acid should be necessary.

Barometric pressure also affects the lamp. Dr. Liebenthal shows that 25 mm., or about an inch, of mercury affects the Hefner lamp 0·28 per cent., and the one-candle pentane lamp 1·2 per cent. The readings by Mr. Paterson, under a maximum variation of the barometer from 739 mm. to 780 mm., or about 1·6 inches of mercury, each show a variation of lamp value of less than 1·6 per cent. from the normal; so this deviation is not considered in the correction curves.

Accepting the Paterson curve as being correct, the effect of the moisture is shown to be considerable. A variation of 1 per cent. in candle power for each 1·515 litres of water vapour per cubic metre of dry air is obtained; and as actual conditions have been noted whereby the moisture varies from 1 to 40 litres per cubic metre of dry air, a correction of the value of the lamp is manifestly necessary, if comparisons are to be made with vacuum electric standards.

Mr. Klump gives curves for determining the variations in candle power of the open-flame pentane lamp, compared with a vacuum electric standard, due to humidity of the atmosphere. They are corrected to 30 inches barometric pressure, neglecting the presence of carbonic acid, on the bases of the ten-candle pentane lamp; and so far as he has been able to determine, they will serve as a correction of the light of almost any open-flame burner and of gas of uniform illuminating quality, which assumingly vary in a value agreeing with this lamp. In other words, the pentane lamp and a gas having a known illuminating value will give apparently constant readings one against the other, independently of the state of the atmosphere.

Mr. Klump recognizes that the value of such a paper as his depends upon its adaptability to use in ordinary practice; and therefore that the lamps must be corrected for humidity conditions. To obtain these, it is advisable to use the wet and dry bulb thermometers, or some equally effective hygrometer, and determine the percentage of humidity from tables furnished by the Government or from the daily reports. He gives curves showing the percentage of relative humidity from wet and dry bulb thermometer readings, and states that with a temperature of 70° Fahr., and a humidity of 60 per cent., the variation will be 3·3 per cent.; in other words, the actual light-giving value of the ten-candle pentane lamp will be 3·3 per cent. lower than 10—*i.e.*, 9·67 candles. To show the extent of the variation of humidity,

* See "Journal," Vol. LXVII., p. 124. † *Ibid.*, Vol. LXXXVII., p. 606.
‡ *Ibid.*, Vol. LXXVI., p. 1338.

and the necessity for making corrections, Mr. Klump gives the following table of the monthly average humidity conditions for Philadelphia for the past 34 years, and their effect on the candle power of the lamp.

Month.	Dew Point. Deg. Fahr.	Moisture. Litres per Cubic Metre.	Variation in Candle Power. Per Cent.
January	24·3	4·2	+ 3·4
February	24·4	4·2	+ 3·4
March	28·6	5·2	+ 2·7
April	37·9	7·6	+ 1·1
May	49·7	12·0	− 1·8
June	59·8	17·3	− 5·3
July	63·9	20·2	− 7·2
August	63·1	19·6	− 6·8
September	57·2	15·8	− 4·3
October	45·9	10·4	− 0·7
November	34·8	6·7	+ 1·7
December	26·6	4·6	+ 3·1
Yearly average	43·0	9·3	..

These figures show that the lamp has a value above the normal during the six cold and dry months of winter, and a value below it for the six warm and humid months of summer. Individual readings have been made in Philadelphia which have shown abnormally excessive conditions of humidity; and assuming that this law holds for these extremes, the lamp value will be affected as follows:—

Excessive Conditions.	Dew Point. Deg. Fahr.	Moisture. Litres per Cubic Metre.	Variation in Candle Power. Per Cent.
Jan. 5, 1904	− 8	0·9	+ 5·5
Aug. 7, 1900	+ 83	39·1	− 19·7

Mr. Klump concludes by referring those of his colleagues who are interested in the subject of photometric standards, and their methods of operation and comparison, to the paper presented by Mr. A. C. Jolley to the Optical Convention held in London last summer, and given in the "JOURNAL" for the 27th of June.

Vertical Retorts in Holland.

Much interest is just now being evinced in the Settle-Padfield vertical retort system in Holland. A bench of twelve retorts on the system is being erected at the Oostzeedyk Gas-Works, Rotterdam. In connection with it, there will be a special test-installation, comprising condenser, washer, purifiers, and station meter; and a special gas-main is to lead the gas to the holder. The bench will probably be put to work quite soon; and we are promised "an absolutely impartial opinion about the results." Another bench of six vertical retorts is being erected at the Tegel Gas-Works, Berlin, in which the principle of the Settle-Padfield system is embodied in all parts except the retorts, which are straight throughout, instead of being curved at their lower ends.

Modern Power Production in Relation to Coal Resources.

Last Thursday evening, Mr. G. T. Beilby, who is well known to many of our readers as an investigator in matters relating to coal subjects, and as President of the Chemical Section of the British Association, delivered his address as Honorary President of the Glasgow University Engineering Society in the James Watt Laboratories. Speaking on "Modern Power Production in its Relation to the Coal Resources of Great Britain," Mr. Beilby said that, at a moderate estimate, there were in Great Britain steam-engines and boilers with a yearly output of 5 million horse power. The coal consumed by these was not less than 5 lbs. per indicated horse-power-hour, or, for 300 days, at 12 hours, 8 tons per annum—equal to 40 million tons in all. The actual figure of consumption for power was 53 million tons. By the use of gas-engines and steam-turbines, the coal consumption might be reduced to 1½ lbs. per indicated horse-power-hour, or 2·4 tons per annum—equal, on the whole, to 12 million tons. The saving in coal was therefore equal to 28 million tons, which, at 7s. per ton, came to £9,800,000. The cost of making the change need not exceed £50,000,000; or, if the power were to be delivered as electricity, £60,000,000. The saving on the coal bill will be equal to a return of 19·6 per cent. on the lower capital expenditure, and 16·3 per cent. on the higher. In many cases the general reduction in working costs which would result from the introduction of more efficient plant would amount to as much as the saving on coal. The means were now at the disposal of consumers whereby power in bulk might be produced and distributed as cheaply as at certain of the more important water-power stations in Europe and America. Apart from the gains to the manufacturer who used, and the engineer who supplied, the power, there was a great economic advantage to the nation in the conservation of its coal resources. The latter was of special importance in view of the steadily increasing demand for power per head of the population, which, if it had to be met by the old wasteful system, would still further tax the coal resources. Under the new conditions, it was probable that the rapidly increasing demand for power might be met by a diminishing coal bill. While financial fiscal remedies were being proposed for the stimulation of home industries, we had really a great economic opportunity, offering profitable employment to the engineering industries, and a guarantee to manufacturers that, in one important respect, they might compete with foreign rivals on fairly equal terms. He hoped that Great Britain would continue to be the engineering pioneer of the world.

THE GAS INDUSTRY IN VICTORIA.

Formation of an Association of Gas Managers.

For the first time in the history of the gas industry in Australia, a meeting of gas managers was held in Melbourne on the 8th of November last, as briefly recorded in the "JOURNAL" for the 19th ult. (p. 825). The object of the gathering was to consider the advisability of forming an Association of Gas Managers in the State of Victoria, or else of holding an informal meeting annually. The idea of the meeting originated from some remarks passed by a few country managers who were visiting Melbourne during the week of the Royal Agricultural Show some months previously. On several occasions attempts have been made to form a Victorian Association, without success; but it was determined this time to make a thorough effort, and see whether an Association would be commendable to gas managers generally in the State, and also, if one were formed, what chance there would be of a representative number joining.

A Provisional Committee, consisting of Messrs. R. O. Thompson, M.Inst.C.E. (Melbourne), S. E. Figgis (Ballarat), and Philip C. Holmes Hunt (Melbourne), was formed, with Mr. Hunt as Honorary Secretary; and a circular was issued to the various gas managers in the State, requesting them to express their views as to the formation of an Association, and to say whether they could attend a meeting to consider the matter, if convened. Success this time crowned the efforts. The day selected for the meeting was one in the week during which Melbourne holds its great racing carnival. At this time the city is practically *en fête*, and visitors from all parts of the State—in fact, from all parts of Australia—flock into Melbourne. Distances being great, and the majority of the managers connected with very small works, it was thought that the holiday season would be a suitable time to select for such a gathering; and the Organizing Committee had no reason to regret their choice of a date.

The meeting took place at the rooms of the Victorian Institute of Engineers, Collins Street, which were kindly lent for the occasion. At the hour fixed—10 a.m.—a good number of managers had assembled; and it was found that the attendance-book contained 33 signatures. In addition to the members of the Provisional Committee, those present included the Hon. George Swinburne, M.L.A. (Melbourne), W. Pain (Bendigo), W. Swinburne (Melbourne), A. Dumont (Bairnsdale), J. Bowman (Sale), J. B. Earl (Lilydale), W. Harrison (Ararat), W. Hawley (Brighton), S. Marsh (Mentone), D. M'Kinley (Kyneton), B. Lord (Maryborough), J. W. Bean (Wangaratta), A. T. Frost (Beechworth), D. Morrison (Maldon), J. Beith (Benalla), J. Lord (Williamstown), T. Foster (Oakleigh), T. Lord (Geelong), J. A. Ambrose (Heidelberg), A. G. Ambrose (Newport), C. W. Howlett (South Melbourne), F. Tipper (Fitzroy), J. W. Thompson (West Melbourne), A. Cusa (Shepparton), T. Skinner (Box Hill), D. Warren (Footscray), W. Frost (Mornington), H. S. Archdall (Castlemaine), A. Krummell (Warragul), and W. W. Morris (Seymour).

On the motion of Mr. FIGGIS (Ballarat), seconded by Mr. LORD (Geelong), Mr. R. O. THOMPSON was appointed Chairman. The Hon. George Swinburne, M.L.A., Minister for Agriculture and Water Supply, Managing-Director of the Colonial Gas Association, and one of the Directors of the Metropolitan Gas Company of Melbourne, sat at the right of the Chairman.

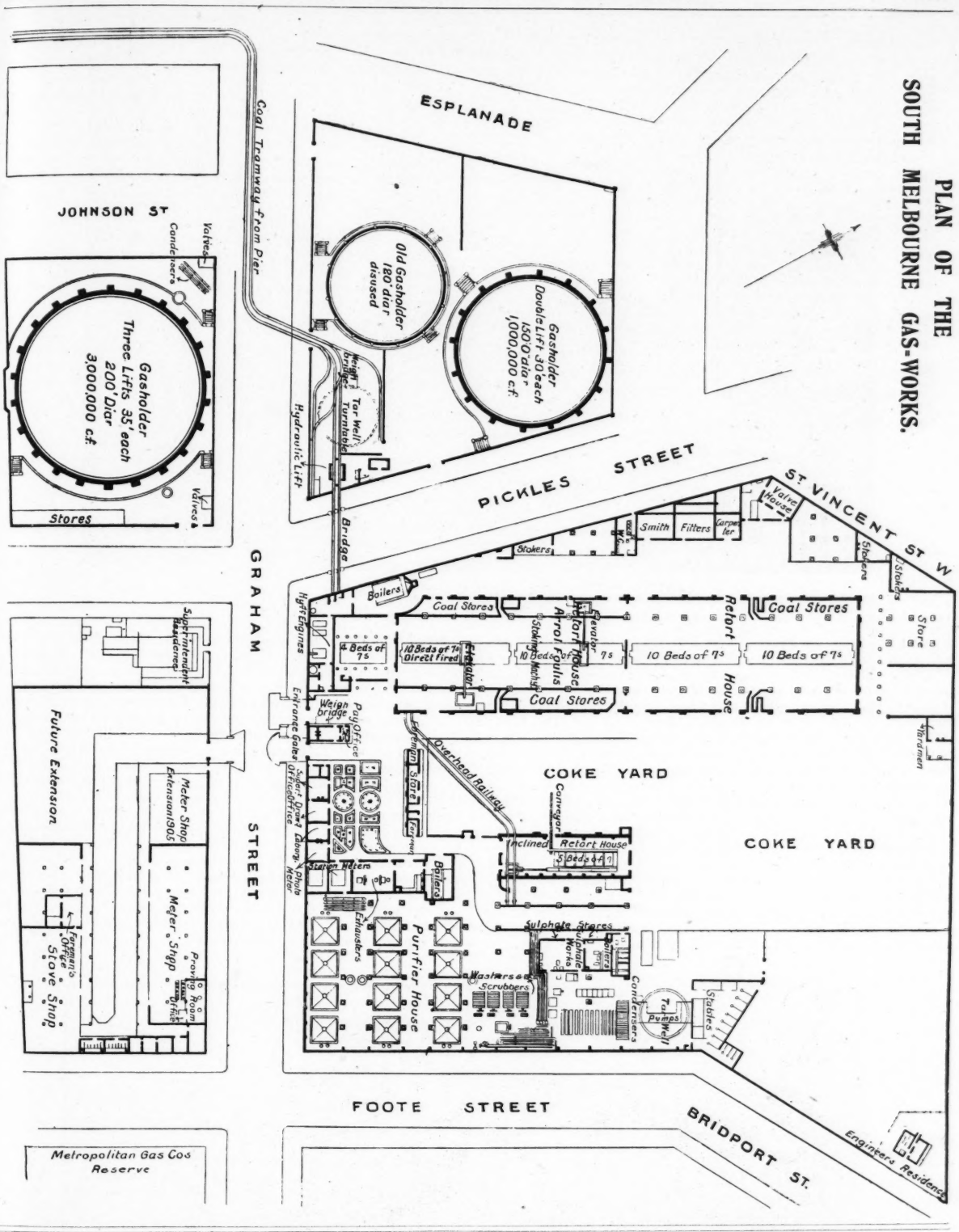
The CHAIRMAN called upon the Hon. Secretary to read the notice convening the meeting, and to submit a statement with reference to it.

The HON. SECRETARY (Mr. P. C. Holmes Hunt), after reading the circular already referred to, stated that 54 copies were sent out, and 43 replies received. Of these, 38 approved of the idea of holding the meeting, and 5 disapproved of it. The promises to attend numbered 27. To those who did not reply to the circular, post-cards were sent; and replies were received from all excepting three. Most were to the effect that the writers could not attend. It was then decided by the Committee that, as a first step to convening the meeting, a circular should be addressed to the chairmen and directors of the various gas companies in Victoria, pointing out the help that such a conference would be to the gas industry generally, and asking them to do all they could to permit their managers to attend; and to this several replies were received promising help in the direction indicated. The Metropolitan Gas Company showed practical sympathy with the movement by inviting the meeting to inspect one of their works, and by offering hospitality. A programme of the meeting was sent out on Oct. 28 to all gas managers in the State, whether they had signified their intention of being present or not, as it was thought that some who might have been wavering at the start might yet be prevailed on to attend. As a result, he expected there would have been about 35 present at the meeting, and he did not think the attendance was very far short of this number.

The CHAIRMAN said that the preliminaries were very satisfactory. They had with them that day a gentleman who was very prominent in the State of Victoria—the Hon. George Swinburne, the Minister of Agriculture and Water Supply, who took a very deep interest in gas and matters connected with it, and had promised to deliver a few introductory remarks at the proposed initiation of their new Institution.

Mr. SWINBURNE said Mr. Thompson had asked him to make a few introductory remarks; and he could assure them it was not his intention to deliver an address. He had to say, however, how glad he was to be there and see them all. He thought they would form the nucleus of a great Association. Nearly every other branch of engineering had its Institute; but up to now they had stood apart, as it were, and this meant a great loss to them. They would be much better off if they came into contact more often. He remembered about twelve years ago issuing circulars to all the gas managers of Victoria, and asking the directors of the companies to assist in getting them together, not only for the furtherance of technical knowledge, but in the interests of the gas industry generally. It, however, fell through. They must thank Mr. Hunt and Mr. Thompson for initiating the movement which had now called them together; and he felt sure before they had finished they would feel it had been good to come together and know each other, and express their inmost thoughts and get advice and talk over their troubles, which was not possible in their usual situation. It was very different there to what it was at home, where they would come to a gas-works about every 10 or 20 miles, and it was easy to get a conference with a brother manager. But in Victoria, where the gas-works were 100 miles apart, it was very difficult for a manager to keep in touch with what was going on. Though they might read the journals every week, and see what transpired in the gas world generally, yet a great deal more could be gained by contact with each other. They got tired of reading incessantly, especially after doing a hard day's work. Still, reading was a very great help. All the same, he was quite sure that the benefit which could be secured by contact and keeping in close personal touch with each other could not be obtained by mere reading. There were lots of things that reading could not express, but which they could tell each other. He thought that a meeting such as the present one would not only be of great benefit to themselves, but to their directors and shareholders also. He felt that in coming before the various gas managers he was on his native heath. It was a great thing to get out of politics and become associated with considerations of tar, ammonia, and leaks. Of course, they wanted a good conference. They were greatly indebted to Mr. Hunt for arranging the meeting; and it afforded him (the speaker), in inducing the Metropolitan Gas Company to take such an interest in it, and invite the managers to inspect their works, the greatest possible pleasure. He hoped it would be their first gathering of many, and that they would be now associated with each other by knowledge of each other. This knowledge, he believed, would do them a great deal of good.

The CHAIRMAN said it was very gratifying indeed to have so distinguished a visitor present to give them a send-off on such an occasion. On behalf of the Committee requested to arrange for the meeting (Messrs. Figgis, Hunt, and himself), he had to extend a hearty greeting to each and all attending this, the first organized gathering of members of the gas industry in Victoria, and indeed in Australasia. The Directors of the Metropolitan Gas Company desired to show their appreciation of the meeting in Melbourne by extending hospitality and a cordial invitation to visit one of their works—those at South Melbourne. The President and members of the Institute of Victorian Engineers also tendered greetings, and kindly invited all or any of the members to be present at their next meeting, when Professor Kernot, of the Melbourne University, would read a paper on the "Economies of Construction." Mr. Oliver, the Engineer to the Metropolitan Board of Works, was also good enough to extend an invitation to join in an excursion by steam launch on the following (Thursday) afternoon, for the purpose of visiting the Spottswood pumping-station of the Board. He had personally to thank them sincerely for the honour of being permitted to preside over their deliberations that day; his official position as Engineer of the largest Gas Company being perhaps his chief qualification for being there. The first coal-gas works established in Victoria was opened in Melbourne in the year 1856, and the late Mr. A. K. Smith was Engineer to the Company then formed. The ceremony of laying the foundation-stone, with full Masonic honours, in 1854 was an imposing one; the stone being "well and truly" placed in its position by the then District Grand Master of the Victorian Freemasons, John Thomas Smith, Esq., M.L.C., the Right Worshipful Mayor of Melbourne, in his civic and Masonic costume, in the presence of the Directors, shareholders, and other prominent citizens, in addition to the members of the Masonic body, who formed a procession to the works, which at that time were some distance from the city. Mr. Smith, three years later—in 1859—constructed the gas-works at Castlemaine, and also those at Bendigo, in 1861. After his retirement from the Company some years later, to commence business for himself, Mr. Smith became Mayor of Melbourne, as well as a Member of Parliament; and at the time of his death, at the comparatively early age of 55, he was Chairman of Committees of the Melbourne International Exhibition of 1880. The Ballarat and Geelong Gas-Works were constructed by the late Mr. Jones; while Mr. Bowman, who was now living in retirement in Sale, Gippsland, constructed many of the smaller works in Victoria—the last two being at Colac and St. Arnaud respectively. On the arrival of Mr. John Coates, of Messrs. Coates and Co., in Melbourne, some nineteen years ago, with capital at his command and abundant energy, he obtained concessions and erected several small gas-works, afterwards forming them into a Limited Gas Association, of which his nephew, Mr. George Swinburne, M.L.A., and a Minister of the Crown, was now Managing-Director in Australia. Mr. Stephen Hutchinson, a former Engineer of the Melbourne Gas Company, also constructed a number of small works on the shores of Port Phillip, in addition to forming the Brunswick Company, recently absorbed by the Metropolitan Gas Company. Other gas-works were constructed at different times by various engineers, only one of which need be mentioned—Newport—owing to Mr. Henry Woodall, a prominent Gas Engineer from England, being connected with its erection. The Melbourne Gas Company in the west end of the city was, after a time, successfully opposed by a Company in the east end, named the Fitzroy and Collingwood Gas Company—an example speedily followed by the South Melbourne Gas Company, formed on the south side of the River Yarra. The three Companies entered strongly into competition with each other until they were amalgamated, in 1878, under the style and title of the Metropolitan Gas Company, and Mr. John Weir, of the Fitzroy and Collingwood Company, was appointed Chief Superintendent—an office he held until his retirement on a well-deserved pension. After the amalgamation of the three Companies, the disentangling and rearranging of the three sets of gas-mains in the streets was for a few years a very serious trouble. Opposing Companies were also promoted, but failed to permanently establish themselves; and now the Metropolitan Gas Company stood alone in Melbourne proper, with a strong competitor in the municipal electric lighting undertaking. This brief *résumé*, fifty years after the erection of the first gas-works in Victoria, brought them to the object of their meeting—namely, for the purpose of considering the best means of furthering the interests of the gas industry generally, as well as those of the members of the profession engaged as managers and assistants in the numerous gas-works throughout the State. To enable these desirable objects to be efficiently carried out, the necessary funds must be forthcoming, and the attendance of members must also continue satisfactory; while papers on the many processes involved in the manufacture and distribution of gas should be provided for debate. They need not necessarily be long and learned papers, so long as they were practical and educational, either in original research or in actual working. The "Question-Box" would prove of value in initiating or promoting discussion; while visits to the various works would enable the isolated gas manager to keep more or less in touch with contemporary engineering and manufacture. The every-day routine of the gas business brought with it many and diverse problems, which no amount of scientific training would really overcome without practical experience; and it was only by a happy combination of theory and practice that success and improvement could be hoped for. The qualifications of those entitled to become members of the Association were open for discussion; and it should be remembered that they were necessarily a small community as yet, and therefore a large number of members could not be expected to join the ranks of a Gas Association. It was still further to be considered that, in the distribution of gas of late years, there had been an entirely new departure. Formerly gas companies were content to draw the line at the meter, leaving the fittings severely alone. The latter were now of paramount importance to the well-being of the business; and the gas manager, especially in the smaller works, had to be particularly wide awake in the matter of incandescent mantles, globes, fittings, &c., as well as of the generally extending automatic meter with its breakfast griller and fittings. Alternative papers dealing with the growing commercial side of the gas business should be provided by a class of members qualified to deal with this subject. The gas business was many-sided, embracing as it did construction, manufacture, and distribution, together with the chemical and commercial branches. It was a duty to their company as well as to themselves that the training of the future gas experts in Victoria should receive attention at their hands, in order that years hence Australia might become self-sustaining, and not altogether dependent upon the Old Country for its supply of gas engineers and managers. He acknowledged that Great Britain led, and was in the forefront of gas engineering. Germany and France were well forward, and there were many eminent men in America. But in this new country, after fifty years' experience, it was nearly time they took the matter in hand, and tried to bring themselves up to a point when they should be independent of outside help. Literature on gas subjects, as Mr. Swinburne had remarked, was at their command every week. In the earlier days, they could only get it once a month; so that they were now kept up to date in gas theories and in the various gas engineering problems of the day. A gathering of this kind could not fail to be of advantage by their meeting together for the interchange of ideas. Hitherto only individual gas managers could meet very occasionally. By bringing all the managers together, and making them members of a Gas Association, they would get every facility for discussing facts and experiences and the results of observation. Let them hope that the present meeting would be the precursor of many others, either formal or informal. What he had said was not intended as a presidential address, but only a short address to set before them, more or less, the views of the Committee. He might say that their friend Mr. Figgis, of Ballarat, as one of the Committee, had taken considerable interest in the affair. They



were also greatly indebted to Mr. Hunt for getting the scheme into shape and sending out the circulars.

Mr. WARREN (Footscray) desired to thank Mr. Thompson for his address, and to point out that the Geelong Gas-Works were erected by Mr. Scoulthard, and not by Mr. Jones. He was in the service of the Company at the time.

The CHAIRMAN said that he had not heard of that gentleman before. He remembered Mr. H. Jones put up the Ballarat Gas-Works; and he understood that he also erected those at Geelong. He was only speaking from memory. When he mentioned the smaller works, he was not in a position to enter into details; and therefore he mentioned only the gas-works at Newport, which was the smallest of the lot. The first matter for discussion was as to the desirability of forming an Association of Victorian Gas Managers. That it was desirable to form such an Association, the presence of so many there that day seemed to prove.

Mr. FIGGIS (Ballarat) said he thought that many present there must see that an Association would be of very great benefit to the gas industry of the State. They periodically received their journals; and the most interesting topics discussed in them were the reports of papers that were read at the meetings of similar Associations in England and on the Continent. He thought it would be an exceedingly good thing if they could meet annually after forming an Association. By reading papers and interchanging views, they should certainly be of benefit to one another.

Mr. WARREN (Footscray) said he supposed he was the oldest there; and it was right he should follow Mr. Figgis. They were all in favour of forming an Association thirty or forty years ago; and that such a thing would do good to the industry to which they belonged, there could be little doubt. The idea in his mind was that such an Institution should be established on a very firm basis, as the Chairman foreshadowed in his opening speech. His Board of Directors were liberal-minded, and would give the Association every possible assistance. They could see that the improvement of the industry would be cultivated by consultations between the managers of the various companies that supplied gas in Victoria. They thought such consultations would broaden the minds of the managers, especially those who were

View of the South Melbourne Gas-Works, looking South.

situated far away up country, and had very little acquaintance with such works as were to be found in Ballarat, Melbourne, and Geelong. There could be no doubt that, in establishing such an Institution as the one proposed, it could not be too strongly urged that the managers who night and day struggled to provide dividends for shareholders should not have to bear the brunt of the expense. The various gas companies should provide their managers with the means of attending the meetings when the Association was established. They might hope that they would be held in various other places in the future, and not always in Melbourne. If an Association was established, all of them should use their best endeavours to bring it before their various boards of directors, as a means whereby they might be educated to make themselves better servants. Some of the smaller gas companies were in a very precarious state. They seemed to be labouring on and struggling against acetylene and electricity, &c. The adoption of these seemed to be the fear of the future; and kerosene was still to be seen in some places where the operations at the gas-works were carried on by one man, who started at 4 a.m., and stopped when he put out the lamps at night.

Mr. Lord (Geelong) said there was a great opening for an Association of the kind. As his honourable friend Mr. Swinburne had remarked, there had been room for such an Association for a considerable time. It was better to establish it late than never. No matter whether the works of a gas company were large or small, there was always something to be learned by visiting them. The managers of some of the smallest works in the State, he ventured to say, had had some experiences that those of the largest works had not had; and some of them had made provision for things that those in charge of the largest works had not thought of. As to the idea of forming an Association such as had been suggested, he might say his Directors were in favour of it, and were prepared to pay all the expenses of their representative to its meetings.

Mr. Frost (Mornington) said he supposed that he represented about the smallest works in the State. When he took them over, they had 48 consumers; while they had now 75. He hoped the Association proposed would be formed with the membership fee fixed at a low rate. Many of his councillors knew very little about gas, though it was a municipal works. It was his idea to fix up

The Meter-Repairing Shop.

INTERIOR OF THE RETORT-HOUSE.

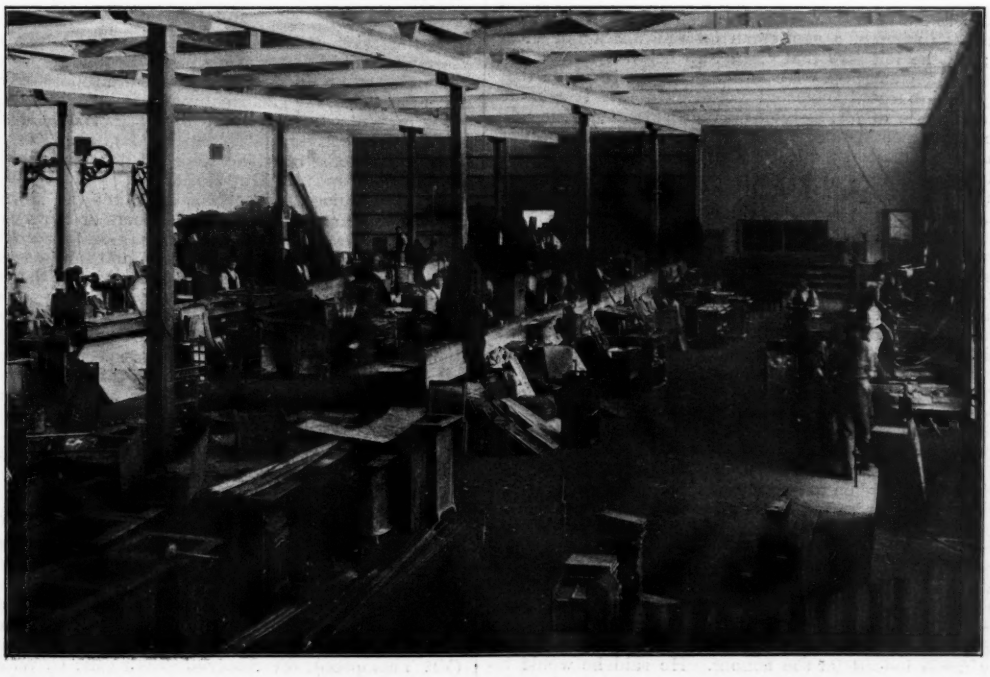
some stoves in connection with the houses, and to get a few on show, where the ladies could go and see them ; but some of the farmers on the Council said : " What, advertise someone else's stoves ! never." So the idea fell flat.

Mr. MARSH (Moorabin) said it afforded him great pleasure to be with them that day. He had been connected with gas management since 1880, when he was at Beechworth. He had also been at Ararat. Since he had been at Moorabin, things had been going forward very well. The increase in consumption had been 25 per cent. ; and they had reduced the price of gas from 7s. 6d. to 6s. 8d. per 1000 cubic feet. This looked all right. He moved—" That an Institution be formed on the lines set forth in the circular—to be called the Victorian Gas Managers' Association."

Mr. BEAN (Wangaratta) said he had very much pleasure in seconding the motion. He thought they should have a meeting at least once a year in the easy season—such as the present one. If this were arranged, most of them from the small gas-works would be able to attend.

The HON. SECRETARY said that the ideas of the Committee when issuing the circular were that either an Association should be formed or else that it should be arranged to hold an Informal Meeting of Managers once a year, on the lines of the meeting of the Scottish Gas Managers. They were all aware, from the reports that appeared in the Technical Press, that the Scottish Managers held an Informal Meeting once a year, apart from the meetings of their organized Association. Personally, he favoured the formation of an Association, as an advantage would be that the gas industry throughout the State would be at once represented by a united body. This would be of great assistance to them ; for questions might crop up—one could not tell in what form—in which such an organization might be of great help. This was one of the strong arguments in favour of the idea. The date fixed for the meeting was no accident. The Committee thought it was a slack time generally, and perhaps a number of managers would be down in town to witness the national sport. As to future gatherings, the date was a matter for the meeting to decide.

Mr. FROST (Beechworth) said he was thoroughly in accord with the idea put forward. So far as his Directors were concerned, he thought they were only too happy that he should attend. Not



THE STOVE-REPAIRING SHOP.

only did a meeting like this allow them to interchange ideas, but it also permitted them to be sociable and friendly. That morning he had met several gentlemen whom he never knew were connected with the gas industry in Victoria, though he knew them in England some years back. He had very much pleasure in supporting the motion.

Mr. HOWLETT (South Melbourne) said that, as a representative of the City Company, he would be very pleased to support such an Association if it were formed. They had, of course, in the city many advantages that the country members had not got; but they were very glad to have the opportunity of extending their knowledge by meeting the gentlemen present, who had had much practical experience, and might perhaps be able to give them the benefit of it. He thought it would be better to form an Association, not in an informal way, but in a proper manner.

The CHAIRMAN put the resolution to the meeting, and declared it carried unanimously.

Considerable discussion then ensued as to the eligibility for membership and the rules of the Association. It was decided that gas engineers, managers, and their technical assistants should be eligible, and also secretaries solely engaged by a gas company. It was further resolved that no one connected with a trading company should be eligible for membership. The matter of rules, however, was referred to the Council to extend as they thought fit; it being understood that the whole question would be brought up at the next meeting for confirmation. It was determined that the officers should comprise a President, Vice-President, three members of Council, and an Hon. Secretary and Treasurer. The month of November was fixed upon for holding the annual meeting. It being understood that this would extend over two days, it was decided to ask the various companies to pay the subscriptions of their engineers and managers, and also their expenses in attending the meetings.

APPOINTMENT OF OFFICERS.

Mr. FIGGIS (Ballarat) proposed that Mr. R. O. Thompson be elected President for the next year. He had the very qualifications for the position, having an admirable presence and being a facile speaker. He hoped the members present would heartily support the motion.

Mr. G. SWINBURNE said he had much pleasure in seconding the proposal. He had known Mr. Thompson now for nineteen years. He was, in fact, one of the first men he (the speaker) had met with after landing in the State. Mr. Thompson had been most honourably connected with the profession, and with the Metropolitan Gas Company in particular. He had just had a very long trip to the Old Land and to America, where he had accumulated very valuable information, which he (Mr. Swinburne) hoped he would impart to the members later on. He was sure that they could not possibly select anyone better than Mr. Thompson as the first President.

Mr. LORD (Geelong) supported the motion; and it was passed with acclamation.

The PRESIDENT thanked the members very sincerely for the honour they had done him. He might have hesitated in accepting the position; but he remembered that next year was the Jubilee of the opening of the first gas-works in Victoria. The foundation stone was laid in 1854, and the opening took place in 1856.

The HON. SECRETARY had very much pleasure in putting before them the name of a gentleman for the position of Vice-President; and he felt sure that when they heard it they would receive it with acclamation. He had the honour to move that Mr. George Swinburne be elected Vice-President. It was no small characteristic of Mr. Swinburne that, notwithstanding all his onerous parliamentary and public work, he was always willing to assist in small matters; and he thought his presence there that day testified to this. They would all be very pleased if he would consent to act.

Mr. HARRISON (Ararat) seconded the motion.

The PRESIDENT said that, in putting the motion, he felt he had got into rather a bad position. Speaking popularly, Mr. Swinburne was his "boss," and now was coming in as "vice" in that particular affair. He ought really to have been President. Mr. Swinburne took great interest in the movement, and had many young men in his various works who might be useful in connection with it.

The motion was carried with acclamation.

Mr. SWINBURNE said it was quite a surprise to him. He had never expected his name to be even mentioned. He thought it a great honour to occupy any position on the governing body of the Association, especially that of Vice-President. Anything that he could do, in whatever capacity, to further the interests of the gas business, he would only be too glad to do. He had not only got its interests at heart as an industry and a profession, but also in other respects. Anything to raise the status of the profession, and meet the competition they had to contend with, would have his aid. They would always find him in the fray.

Mr. J. W. THOMPSON (West Melbourne) moved, and Mr. LORD (Geelong) seconded, that Mr. P. C. Holmes Hunt be elected Hon. Secretary and Treasurer; and this was carried unanimously.

The HON. SECRETARY, in acknowledging his election, thanked them very much indeed for the honour. He said he would be very pleased to do what he could in the interests of the Association and of gas generally. There was a certain small amount of work connected with the duties of Hon. Secretary in such an Association as theirs which members could assist in materially; and he was sure they would always be willing to do so, judging from the number that had responded by turning up that day. He would particularly point to one matter that might be an anxiety—namely, the question of finding technical fare for the meetings. He hoped gentlemen would come forward and offer to read papers, not necessarily long dissertations, but concise papers on their experiences, written with the object of creating good discussion. He thanked them for their confidence.

Messrs. Figgis (Ballarat), Warren (Footscray), and Thomas Lord (Geelong) were elected members of Council.

Mr. J. W. THOMPSON (West Melbourne) said that he had much pleasure in proposing a vote of thanks to the Committee, coupled with the name of the Hon. Secretary, for the manner in which they had worked to bring the meeting to a successful issue. The energy that Mr. Hunt had displayed had been enormous. It had taken him a lot of time to attend to correspondence, and he thought they ought to give him a hearty vote of thanks.

Mr. FROST (Beechworth) seconded the motion, remarking that his experience was that Mr. Hunt was very zealous.

The PRESIDENT said that a great deal, if not all, of the success of the meeting was due to Mr. Hunt, the Hon. Secretary, having taken the matter up in such an energetic way and worked so hard. Mr. Hunt had taken a lot of time and trouble to bring them together; and he had very much pleasure indeed in putting to them that a hearty vote of thanks be passed to him.

The HON. SECRETARY thanked them very much for the hearty vote of thanks they had passed to him. He could only repeat that he would be very pleased to do all he could for the Association. It had been quite a pleasure to do what little he had done to organize the present meeting. The President had said some very kind words in relation to him; but he (Mr. Hunt) would like to say that he had had Mr. Thompson at his right hand all the time. He had advised him what to do and what not to do; and his mature judgment had helped a great deal.

Mr. WARREN (Footscray) moved a hearty vote of thanks to Mr. Thompson. From the start of the meeting, he made an impression on their minds that he was fully up in his profession as a gas manager, and was capable of being a good tutor to those who held office in a smaller way than he did. The manner in which he had conducted the meeting that day had been very agreeable to them, and the way in which he had engineered the formation of the Association was quite unique. His tact deserved recognition.

Mr. W. SWINBURNE (Melbourne) seconded the motion, and fully endorsed all that had been said by Mr. Warren, as to the able manner in which the President had conducted the business of the meeting. Everything had been done most satisfactorily. Mr. Thompson's introductory remarks were certainly very instructive; and he hoped that later on they would hear more on the subject by way of a lecture. He asked the members to carry the motion with acclamation; and this was done.

The PRESIDENT thanked them sincerely, and re-affirmed that he would do his best for the Association during the year.

A Question-Box had been arranged for the technical part of the programme, but owing to the shortness of time it was decided to hold this over. It was proposed, however, to make this a feature of the annual meetings.

At this stage, the meeting broke up; the whole company re-assembling a little later at the Savoy Restaurant, where they were hospitably entertained at lunch by the Metropolitan Gas Company. Mr. John Grice, the Chairman, was unavoidably prevented from being present; but the Board were represented by Mr. G. Swinburne; the Secretary (Mr. John Hinde) being also present.

After the toast of "The King" had been duly honoured, Mr. THOMPSON proposed "Our Hosts."

Mr. SWINBURNE, in replying, said that the Metropolitan Gas Company desired to make the members of the Association very welcome. He referred to the competition that would have to be met by the gas industry in the future, and said that everyone connected with it must have his wits about him, or they would lose in the race. They must get an extra production per ton of coal and less leakage. He was immensely pleased that the Association had been formed with such great success. They could not do better than wish it the greatest possible prosperity—not only from the gas managers' point of view, but from that of companies to whom the operations of the managers were an important factor. He was happy to have been at the birth of the new Institution, and hoped it would live long. He was sure his brother Directors in the Metropolitan Gas Company would leave no stone unturned to help the Association.

VISIT TO THE SOUTH MELBOURNE GAS-WORKS.

After luncheon, conveyances were found waiting to convey the party to the South Melbourne Gas-Works. A circuitous route was taken; the members being driven through Albert Park into St. Kilda, reaching the works by way of the Esplanade along the foreshore of Hobson's Bay. On arriving at the works, they were met at the entrance to the coal-receiving yard by the Engineer (Mr. Thompson), the Superintendent (Mr. C. W. Howlett), and other officials, who at once took the party in hand and explained the various portions of the plant. Fortunately, coal-receiving

operations were in full swing—a steamer having arrived that morning with a cargo.

Coal is received at the steamer's side, at the Port Melbourne Town Pier, at the average rate of 110 tons per hour, into the Gas Company's trucks, and conveyed three-quarters of a mile to the works. The trucks (75 are employed) are drawn by horses, a weight of about 5¾ tons being allotted to a horse each trip. On arrival at the works, the trucks, after being weighed, are elevated, two at a time, to a higher level by means of two hydraulic lifts capable of raising 10 tons each. The trucks are then propelled by hydraulic capstans and ropes across the bridge over Pickles Street to the various discharging points in the retort-houses; the coal being dumped into the different stores as required. For providing the necessary power for these operations, a hydraulic pumping-engine, built by Messrs. John Abbot and Co., of 50 nominal horse power (the accumulator pressure being 700 lbs. per square inch), is installed. This machinery is accommodated, together with the hydraulic pumping-engines for the stoking machinery, in a spacious and lofty engine-room, lighted with lantern lights; the boilers being in an adjoining building.

The main retort-house is divided into three sections. No. 1 contains four regenerative beds of ⏍ retorts (equal to 56 mouth-pieces), charged and drawn by hand labour. No. 2 contains twenty beds of direct-fired ⏍ retorts, seven in a bed, each retort being 21 in. by 15 in. and 20 feet long. This section, which is capable of producing about 1,600,000 cubic feet of gas per 24 hours, is worked by means of Arrol-Foulis hydraulic stoking machinery; the necessary coal breakers, elevators, and overhead coal-storage tanks being provided. Two elevators are installed, feeding into two 20-ton overhead hoppers, which in turn supply the hoppers on the charging-machines. No. 3 section, which contains twenty beds of seven oval retorts, is about to be reconstructed; the intention being to put in regenerative furnaces and a stage-floor. The small retort-house, which, it will be noticed from the plan, is built parallel to the large one, contains five beds of inclined retorts. They are on the Coze system; and the installation was erected in 1892. The retorts are 15 feet long, set seven in a bed, and at an angle of 32 degrees. The installation is provided with elevator, coal-breaker, and overhead hoppers; the machinery being driven by means of a vertical steam-engine of 7 nominal horse power. The coke is carried into the yard by a hot-coke conveyor of the plate or carrier type; the coke being quenched *en route*.

The condensing plant consists of two of Cutler's "Perfect" condensers, and four sets of annular and two of horizontal pipe condensers, having a capacity of 2 million cubic feet per 24 hours. Ample washing plant is provided; there being two Livesey washers, of a capacity of 2 million cubic feet per 24 hours, four "Standard" washer-scrubbers, and one Walker purifying-machine of a capacity of 3 million cubic feet per day.

Adjoining the washing plant is the purifying-shed, where three sets of purifiers by Messrs. C. & W. Walker, fixed on the ground level, are in use. Each purifier is 24 feet square, and the purifying material used is oxide of iron; the capacity of each box being about 35 tons. Ample space is provided for revivification. The shed is covered with a light roof of corrugated galvanized iron. It is interesting to note here that only oxide is used for purification; lime being unnecessary. Not only has the Company always been free from the now obsolete sulphur restrictions, but the coal carbonized (all from New South Wales) only produces from 8 to 10 grains of sulphur, and sometimes less, per 100 feet of gas.

Between the inclined-retort house and the condensers, the sulphate of ammonia house is situated. The plant here consists of two complete units; the second being a Wilton plant with circular saturator and liming apparatus.

Close to the entrance gates of the works, substantial brick buildings provide accommodation for two sets of exhausters by Gwynne, each of 150,000 cubic feet capacity per hour; also two station meters, one of 100,000 and the other of 150,000 cubic feet capacity per hour. Adjoining these are the laboratory, photometer-room, and drawing and engineer's offices. Facing these offices are the stores, &c., and accommodation for the foremen; and in the quadrangle formed by these three buildings and the coke office is a small landscape garden, which, from the appearance of the shrubs and flowers therein, shows that in Australia, at any rate, there is no difficulty in growing such things on gas-works. The valve and governor houses, situated at the north end of the works, are provided with one 24-inch and four 18-inch governors, all of the Cowan make.

Ample storage accommodation is provided by two gasholders —No. 1 (a three-lift) having a capacity of 3¼ million cubic feet, being 200 feet in diameter and each lift 35 feet deep; and No. 2 (a two-lift) of 1 million cubic feet capacity, the diameter being 150 feet, and each lift 30 feet high. In addition to these, there is a 3 million cubic feet holder situated at the outlying station at Tooronga, four miles distant; a special 24-inch main running from the works and supplying it. At Tooronga are placed the exhausters, driven by gas-engines, which draw the gas from the works and pump it into the holder.

Crossing the main road, the party inspected a most important section of the Company's undertaking; for here the extensive and commodious meter and stove repairing shops provided the visitors with a considerable amount of interest. The Company repair the whole of their meters—only the dry make being used; and about 11,000 meters pass through the shops every year. In addition to the work of ordinary repairs, the Company are now engaged, to some extent, in converting ordinary meters into prepayment ones; the attachments used being the invention of one of their own workmen, and one which so far gives every satisfaction. A great deal of work is carried on in the stove-repairing shop, where about 5000 stoves are repaired and cleaned annually. The stoves in use are of Colonial design. Both the buildings are constructed of red gum and Oregon timbers, with galvanized iron fronts and roof, and are lighted by three rows of top lights. Owing to the increase of work in the meter department, the repairing-shop has lately been extended, and is now 363 feet long by 60 feet wide; the stove-shop being 216 ft. by 60 ft. About 100 hands are constantly engaged in the two departments.

After inspecting the meter and stove repairing shops, the party were entertained at afternoon tea. The members had found it exceedingly warm looking round the various parts of the works (the thermometer in the shade standing at 93½°); and consequently this light refreshment was found very acceptable. Afterwards a hearty vote of thanks was passed to the Directors of the Company for their kind invitation to inspect the works, and also to Mr. Thompson and his assistants for their courtesy in showing the members round. Mr. Thompson, Mr. Hunt, and Mr. Howlett briefly responded, and this brought to an end the first meeting of gas managers in Victoria, which was generally pronounced a great success.

Monazite from Brazil.

The "Brazilian Review" states that the quantity of monazite exported from Brazil in 1902 was 1205 tons; in 1903, 3299 tons; and in 1904, 4860 tons.

Sulphate of Ammonia in Japan.

The French Vice-Consul at Kobe (M. Aymé Martin) has recently reported to his Government on the increasing demand for fertilizers in Japan, noticeable in recent years, owing to the adoption of scientific methods of agriculture. He states that in 1904, the imports of fertilizers, which had been growing steadily for some years, showed a slight diminution, owing to disorganization caused by the war. During the first six months of 1905, however, the value of the fertilizers imported amounted to 12,976,352 yen, as compared with 5,757,075 yen in 1904. The increase was shown chiefly in oil cakes. A large increase was also shown in the imports of sulphate of ammonia (638,217 yen), phosphate of chalk (1,179,304 yen), and nitrate of soda (636,997 yen); these, with oil cakes, being the fertilizers most in demand. A very large proportion of this trade goes to Kobe, which takes six-sevenths of the oil cakes, two-thirds of the phosphate and sulphate, and one-half of the nitrates. One-third of the nitrates are imported from the United States, and the remainder from Chile and various other countries. Nearly the whole of the import of phosphate of chalk and sulphate of ammonia comes from the United Kingdom. There are a certain number of chemical factories at Osaka which produce fertilizers, more especially sulphate of ammonia.

Sulphur in Petroleum and Bituminous Minerals.—In a recent number of the "Journal of the Society of Chemical Industry" there was published the result of an investigation conducted by Dr. F. C. Garrett and Mr. E. L. Lomax, B.Sc., with the view of determining the quantity of sulphur in petroleum and bituminous minerals. The process consists in mixing a weighed quantity of the material in a small platinum crucible after intimate admixture with 4 parts of pure lime to 1 part of anhydrous sodium carbonate. The crucible with its contents is then covered with a larger one of the same material, the whole inverted, and the space between the two crucibles subsequently filled with the soda-lime mixture. Ignition is then applied under suitable conditions in a gas-muffle. The idea is the total decomposition of any volatile products; and the authors prove, by published experiments, that this can be carried out. The total sulphur is estimated in the usual way, by solution of the fixed mass and subsequent estimation as barium sulphate.

The Metric System Applied to the Sale of Gas.—We have received from Mr. T. Fisher Unwin "Martin's Tables of Measures, Weights, &c." The book contains tables and information upon Imperial, Indian, and Colonial measures and weights, with simple suggestions for the adoption of the metric system. The book was originally published in 1904; but since then the occurrence of several important events in connection with the subject, and the general recognition of the necessity for reform in our system of measures, weights, and coinage, have led the author (Mr. A. J. Martin), who is an honorary member of the Incorporated Society of Inspectors of Weights and Measures and a member of the Decimal Association, to revise his work. The book is of interest to our readers, apart from its general utility, from the fact that it contains a chapter on the application of the metric system to the sale of gas, for which the author is indebted to Mr. H. R. Bickley, an official of the Tuscan Gas Company, at Vercelli. While we have doubts as to the eventual adoption of the metric system in the commercial branch of the gas industry, we think Mr. Bickley has set forth its advantages, from his point of view, in a concise and intelligible manner; and we therefore heartily commend the book to our readers' notice.

LACHOMETTE'S SETTING OF VERTICAL RETORTS.

In view of the interest now being taken in the subject of vertical retorts, we give some particulars of a setting for which a French patent has been taken out by MM. Lachomette, Villiers, et Cie., of Lyons. The arrangement is shown in the accompanying illustrations; fig. 1 being a vertical section on the line A A of fig. 3, fig. 2 a vertical section on the line B B of fig. 1, and fig. 3 a horizontal section on the line C C of that figure.

Below the operating floor are arranged a generator A and a recuperator B. Upon the angles of the brickwork of the setting, rise four pillars C, which support the portion of the structure containing the retorts D. Between these pillars are spaces to allow of the manipulation of the discharging appliances. Each retort is preferably composed of three pieces fitted one into the other, or more generally of superposed pieces. This arrangement diminishes considerably the risk of fracture or dislocation from unequal expansion of the different parts of the retort; moreover, it allows of the replacement of any parts which are worn out—especially the upper portions, which are those most exposed to wear. The shoulders formed by the junctions of the pieces composing the retort serve to support the slabs E, intended to guide the flames as well as to impart strength to the structure. In the pillars and walls of the upper portion of the setting there are conduits F G H I, for the passage of the heating gas, the air for combustion, and the burnt gases.

The gas leaving the generator is conveyed by the conduit F into a horizontal channel J, whence it passes into the upper portion of the setting by the openings K. The air heated by the recuperator is led by the conduit G into a horizontal channel L, which it leaves by openings made a little below those at K. The flames issuing from these openings descend and encircle the retorts, following the zigzag course formed by the baffle-plates E, as shown in fig. 2. At the bottom of the portion of the setting

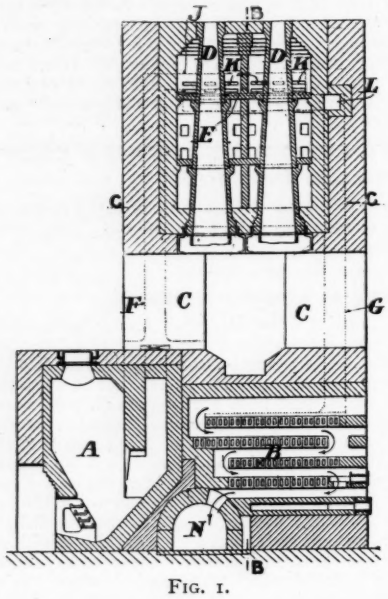


Fig. 1.

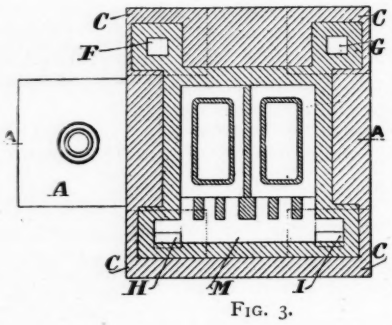


Fig. 3.

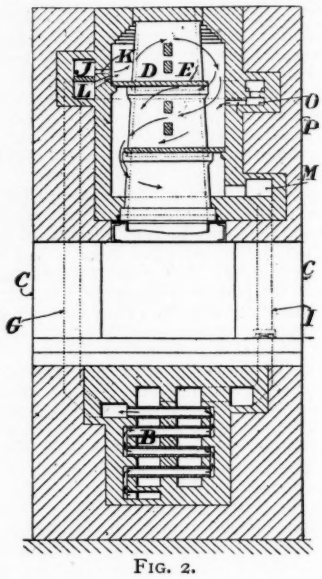


Fig. 2.

containing the retorts there is a horizontal channel M (fig. 3), by which the burnt gases reach the conduits H I, by which they are conveyed to the recuperator, whence they escape by the chimney N.

In order to ensure complete combustion of the gases, and to increase the heating of the centre of the retorts, a supplementary channel O is connected with the conduit G, and distributes, by means of the openings P, heated air at the summit of the second of the three compartments formed by the baffle-plates E. This chamber is thus brought to a high temperature by the combustion of the excess of unburnt gas in the upper compartment. The flames afterwards heat to a less degree the lower one. By regulating the passage of the air and gases through the conduits F G and O, it is possible to produce the maximum temperature, either in the upper chamber or at a lower point. If necessary, in addition to the opening P, others may be arranged to admit air at different heights in the setting, so as to obtain the most suitable temperature at all points.

The principal features of the setting described are: (1) The arrangement of the retort portion of the furnace on pillars resting upon a solid structure formed by a gas-generator and a heat-recuperator; (2) the arrangement of gas, air, and smoke conduits through the pillars; (3) the placing of the "burners" at the top of the furnace, with baffle-plates forming zigzag compartments, and openings for the admission of additional air at various points; (4) the construction of the retorts in several pieces fitted one into the other; and (5) the arrangement of horizontal and vertical partitions round the retorts.

APPLIANCES USED IN BORING FOR GAS.

In a recent number of the "American Gaslight Journal," an "Inspector" makes the following remarks on the various tools employed in boring for gas.

I often find some singular or odd sorts of contrivances for boring for gas, and I name a few in connection with the illustrations. There are, of course, a great many exceedingly well-constructed boring devices in use—quite up-to-date in every detail; still one finds in the service many which are out of date. I will here refer especially to the latter kind, as a matter of interest and curiosity. The usual circular motion is imparted to practically all the boring contrivances, and, as a rule, the motion is imparted to the tool at the top of the bore. In common descriptions of strata, the mere weight of two men bearing upon a lever attached to the head of the tool is ample to produce penetration. But in rocky strata the chisel forms have to be used; and these are struck down by repeated blows. The elastic wood pole is sometimes used with the free-fall system of boring; and then, again, lines of rods with screw connections may be seen in service.

The tapering tool shown in fig. 1 (see p. 171) has been used for boring purposes in foreign countries with effective results. I saw some of this form of tools in Japan and the Hawaain Islands. Places suspected of retaining gases are drilled into with this tool, and gas-reservoirs are often tapped. Sometimes considerable rigging is used in the operation of the drill. Again, I find the simplest of devices employed for this purpose. In recent years the makers of boring tools have shipped to foreign lands many appliances for boring purposes, and these machines may be seen in practical service. In fig. 2 is shown a form of screw-pointed boring-tool I have noticed. It is rather peculiarly designed. There is a cone-shaped cup, arranged as shown, that goes downward to the screw-point. The tool is caused to revolve by levers; and when it is inserted into the sands, the latter are received over the edge of the cup. When the cup is filled, the instrument is raised for emptying. In fig. 3 is shown a useful boring-bit of the cone order, with spiral edges upon the oval surface. This tool is used when the substances to be drilled are hard. The weight and pressure of the tool force it into the substances, causing a breaking up and lifting of them.

The style of drill seen in fig. 4 is seldom used for purposes of boring for gas in the United States. It is one of the crudely-constructed devices worked by native boring parties in Guam. I stopped over one day at Guam, while the transport on which I was journeying was loading with products and unloading supplies from the States. I then had an opportunity to observe the systems of boring by the natives. The tool is a stout metal shaft operated by a hand lever at the surface of the earth. The saucer-shaped piece is fixed to the shaft as shown, and is the medium by which the loosened earthy matters are lifted to the surface. One of the odd forms of boring devices I noticed in another place, and used for tapping for gas, is shown in fig. 5. It consists of the shaft for reaching down into the hole and the peculiarly-designed threaded headpiece. This is a solid section of steel, deeply cut with threads, and connected to the lower end of the boring-rod by a key. The object of the threadwork is to form a means by which a bore already cut may be enlarged. The base hole

has to be made first, and then this instrument, with its sawlike sides, is scraped up and down, finishing off the bore, and making a straight up-and-down hole. Another type of enlarging and finishing tool for holes already penetrated is shown in fig. 6. The lower or cutting edge is shaped like a chisel; and as the tool is lowered through the bore, it is twirled enough to scrape the sides.

A cylindrical form of boring-tool is illustrated in fig. 7. This hollow cylinder is made of sheet steel, lapped and riveted, with the lower edge formed as shown, and sharpened to a cutting point. Inside is a drop valve, so that when the sand is forced up into the cylinder and the cylinder is lifted the valve closes, holding in the earthy substances.

Rods frequently broke in the work as I observed, then patching would be done. Often the connection is made between rods by means of the coupling with keys as in fig. 8. Sometimes the union is of the design presented in fig. 9. Fig. 10 shows a form of hand lever utilized for operating the rods at the top of the well. The head of the rod is squared off, and the socket of the lever fits over this headpiece. Thus a very firm grip may be obtained on the rod.

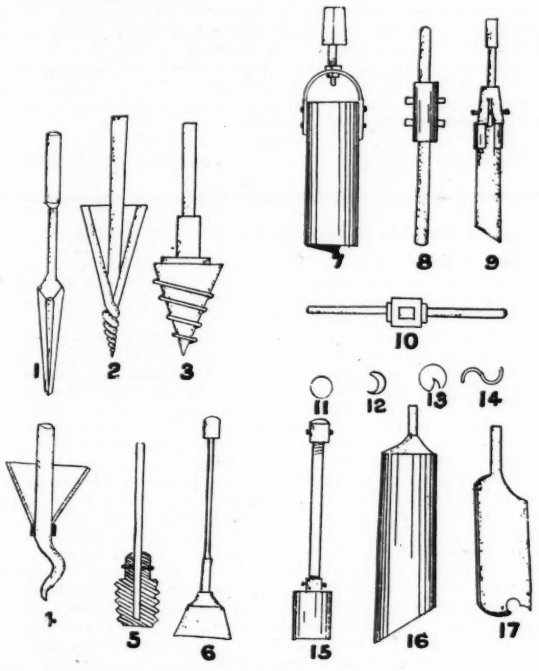


Fig. 11 shows one form of the cutting edges of the drills. I find that some of them describe perfect circles, as in this diagram, while others are of the half-moon description, as shown in fig. 12. Again, some of the cutting edges of the boring tools are modelled according to the broken circle edge, as shown in fig. 13. A great deal depends upon the character of the substance to be drilled through. A portion of the strata is soft earth or loose sand; while again we find instances of hard rock, slate, and small stones. For the latter service, the tool possessing an edge of the S-shape design, as in fig. 14, is used to good advantage. Fig. 15 illustrates the design of weighted end utilized in certain lines of work. When the free-falling system of boring devices is used, the weighted connection is often adjusted in the rod, to add to the force of the drop. The shock system of boring is also employed in connection with this plan. Some of the boring contrivances are of the order exhibited in fig. 16. This type consists of a plain cylinder of the proper diameter for cutting the bore, about 4 feet long, with a tapering head or cutting-end as shown.

In boring for gas, beds of sand are frequently met with which cannot be touched by the ordinary tool; and for this service the form of tool of the scoop-end order, shown in fig. 17, is utilized.

The Chinese system of boring the earth to get the brine of salt water has been adopted in some of the localities where boring for gas is in progress. This consists of a cutting tool adjusted inside a cylinder; and the entire combination is lowered with the progress of the boring. The tool gathers the cut or loosened stuff into the cylinder, and the latter is lifted occasionally to be emptied, and then dropped back for refilling. In the course of the day, a considerable depth is bored.

Institution of Civil Engineers.—At the ordinary meeting of the Institution on Tuesday last, it was announced that 48 associate members had been transferred to the class of members; among the number being the following: Mr. Herbert Ashley, Resident Engineer of the Portsmouth Water Company; Mr. C. J. Batley, who holds an appointment in connection with the Oldham Water-Works; Mr. Frank Howarth, the Water Engineer to the Plymouth Corporation; and Mr. J. A. M'Pherson, who is in the service of the Bristol Water Company.

GAS-DRIVEN CANAL BARGES.

In the last number of the "JOURNAL," it was mentioned that an experiment in propelling canal barges by means of gas was being carried out, with the view, if possible, of reviving the declining interest in the inland water-ways of the country. The experiment consisted of a canal journey to the Midlands; and it was arranged that the conductor of the expedition (Mr. Thomson) should send a descriptive account to the "Standard." He did so; and particulars of the first stage of the journey appeared last Friday. The gas-motor barge *Duchess* left Brentford on Wednesday, the 3rd inst., at about 2 o'clock, freighted with 11 tons of zinc and 4½ tons of coal for the gas-producer, with a heavy "butty" boat, loaded with 23 tons of sugar, in tow. The first day's run occupied 7½ hours, and totalled 10½ miles with the passing of eleven locks. Next day 17¼ miles were covered in 8¼ hours—24 locks being passed. On the 5th inst., the engine was started in ten minutes, and no replenishment of fuel was required in a 12½ hours' run, in which 41 locks were passed, 23¾ miles travelled, and 3 cwt. of coal consumed. On the 6th, Braunston, the terminus of the Grand Junction Canal, 93 miles from London, was reached at eight o'clock in the evening. Before arriving, a test was made to demonstrate the hauling capabilities of the gas plant. This was arranged by coupling a pair of "butty" boats to the one attached to the *Duchess*, which, with the three in tow, travelled 1¾ miles in 37 minutes. On reaching the Braunston Tunnel, another pair of boats and a steam-tug were added to the train, which, together, made four loaded boats and a steam-tug, while the resistance offered by the propeller of the latter must also be considered. The tunnel, 2042 yards in length, was passed in 49 minutes. For the first 1000 yards the engine was working on one cylinder only, and this distance accounted for 30 minutes; the remaining 1042 yards, with the two cylinders at work, taking only 19 minutes. The Warwick and Birmingham Canal was entered at 11 a.m. last Tuesday; and its entire course of 22½ miles and 34 locks was completed in 10⅔ hours—several level sections, freshly dredged, and with a depth of about 6 feet, being covered at a speed exceeding four miles an hour. Mr. Thomson says the conclusions arrived at from the experiment, which has included 159 locks and a total distance of 135½ miles, are highly favourable to the suction-gas plant and its application to the canal barge. The few alterations or improvements necessary include a different type of propeller and a charging hopper or producer, to avoid any delay in refuelling. A reduction in the horse power of the engine from 25 to 16, or even 12, would produce equally useful results. The fuel consumption for the 135½ miles was 18 cwt.

PERSONAL.

Mr. PHILIP S. MORTON, who has been for the past three years with Mr. Fletcher W. Stevenson at Coventry, has obtained an appointment with the Continental Union des Gaz, to superintend the construction of new works at Genoa, and afterwards manage them. He is a son of Mr. Robert Morton, and he served an apprenticeship with Messrs. George Wailes and Co., of Euston Road, after which he was under Mr. J. Tysoe, at the East Greenwich Gas-Works, until he went to Coventry in the autumn of 1902.

Mr. JAMES ARMSTRONG, Assistant-Manager at the Long Eaton Gas-Works, has been appointed Manager to the Ilfracombe Gas Company, in place of Mr. C. E. Ball, whose retirement was announced a short time ago. Of the 152 applicants for the position, two—Mr. Armstrong and Mr. W. H. Ely, Assistant-Manager at Oxford—were selected for an interview with the Board. Mr. Armstrong was the successful man; but the Directors thought most highly of the qualifications of Mr. Ely, and felt it very difficult to decide between two such good candidates.

Explosion of Gas at Messrs. Crossley's Works.—Last Friday, a gas explosion occurred at the works of Messrs. Crossley Bros., Limited, at Openshaw. During the last three or four years the firm have been making producer and suction gas plants; and quite recently they constructed a 2500-horse power producer plant to drive the gas-engines in their works, as well as to heat their boilers. One boiler has been already fitted with the new apparatus, and on the morning of the accident it was being experimented with. As soon as a light was applied, there was a violent explosion, the effect of which was that an engineer and the boiler attendant were thrown down, and the latter had his arms slightly burnt and was bruised and shaken.

Bacup Water-Works Scheme.—On Monday last week, a public meeting of the ratepayers of Bacup was held to consider the Bill promoted by the Corporation to obtain authority to borrow £75,000 for the completion of the Cowpe Valley water scheme. The Mayor (Alderman Maden), who presided, explained that originally the Corporation applied for £140,000, and let the contract for the work for £86,000 or £87,000. This figure had, however, been exceeded by upwards of £20,000. Instead of sinking to a depth of 50 feet, they found it necessary to go down 190 feet; and they were asking for an extension of time till 1908 for the completion of the works. Of the amount now applied for, £25,000 was required for land, and the rest for filters, mains, and pipes. The Corporation were also seeking power to increase the charges for water from 7½ to 10 per cent. on the gross rental of premises supplied. There was practically no opposition.

CORRESPONDENCE.

[We are not responsible for the opinions expressed by Correspondents.]

Naphthalene.

SIR,—I have read with considerable interest the several communications you have recently published on the above subject, which is still a very interesting one in the whole gas industry. I am especially interested in the last two communications from the pen of my friend and colleague, Mr. Young, of Peebles, as I think they may tend to clear away some of the misunderstanding of this subject which is in the minds of certain of our professional brethren.

I should like to take this opportunity of stating that, in addition to experimenting with and using (much to our advantage, in producing 18½-candle gas) the modification of the Young and Glover process which Mr. Young speaks of as the "St. Helens modification," we have also used, in conjunction or alternating with this, the two other forms in which the Young and Glover process may be applied—viz., the washing of the gas by means of a supplementary supply of hydrocarbon fluids obtained from our tar-distilling works, and the vaporizing into the gas of liquid hydrocarbon products suitable to absorb any naphthalene which may have escaped absorption, and to prevent its being deposited anywhere in the distributing system in the solid form. By these means, we have been able to redeem St. Helens from being one of the most naphthalene-stricken places (which it was ten years ago, when I first impressed Mr. Young with the importance of the subject) to the happy state of being absolutely free from any trouble whatever from naphthalene.

I have been asked more than once lately why the people who are now claiming to be making such a saving by the adoption of either the washing or the vaporizing part of our process have been so slow in adopting it, but I have not been able to answer the questions; and I actually find men holding—I do not say filling—the position of gas engineers who still question whether the naphthalene difficulties have been really and permanently overcome. There seems to be a mistaken impression in the minds of some, that they are not to use and acknowledge the work of men who have been in front of them, but must wait until they can at least make a pretence of having discovered or invented something themselves; and this partially, I have no doubt, accounts for what you speak of in your retrospect of 1905 as a "regrettable lack of support" which has been given to the naphthalene inquiry instituted by the Southern District Association, the continued delay in the publication of the final report of which has kept back some from making up their minds to try that which has already been provided for them, and which would prove, if properly applied to any set of circumstances, that the problem has been solved.

I might, perhaps, here remind your readers that the Young and Glover specification is No. 20,125 of 1896, and that it was published in 1897; and I think that if it were now read in view of the successful applications of its principles which we keep hearing of, any fair-minded man capable of grasping its details would admit that it embodies and clearly sets forth the scientific principles upon which depends the successful working of the process which has been realized during the last five or six years.

SAMUEL GLOVER.

St. Helens, Jan. 13, 1906.

The Future of the Gas Profession.

SIR,—It is just five years since I suggested, in a letter to the "JOURNAL," such a scheme as is proposed by "Lux" in the current issue—viz., that the parent Institute (there were two of them then) ought to take this momentous question into serious consideration. "Lux" forgot to add that, not only are places advertised at unfairly low salaries, but those worth having are generally filled beforehand, or in plain language "cooked." My advice to any young man desirous of becoming a gas engineer or manager is "Don't"—unless he is connected with some influential Clan in the profession. I would dissuade a son of mine from thinking to follow in my footsteps, when there are other professions open to him whereby, if he has anything about him, he can command as much remuneration when he has completed his articles as his father can ever obtain as a gas engineer when more than twice his age; and this is advice I have heard from others much higher up in the profession than myself.

The pittances offered to intelligent men, after years of strenuous preparation, for responsible positions in the administration of gas-works, are nothing short of scandalous; and I really believe that the state of affairs is worse now than ever. At least, I see no improvement in the five years that have elapsed since the matter was spasmodically ventilated before. If it is not so, how is it that the gas profession is not given a leading place in any lists of suitable vocations? I have often noticed that, if mentioned at all, it is at the tail end—and with precious little comment at that—and in the published lists of Societies, the Gas Institute is generally mentioned the last. Surely it is sufficiently influential to take a front seat in the public view.

There is evidently something radically wrong somewhere; and it is high time the powers that be (though ensconced in comfortable positions themselves) shook off this apathy, woke up, and asserted themselves, if the gas industry is worthy the name of a profession. As things are at present, what have the general body of gas engineers and managers to look forward to in their old age on the paltry salaries paid? Not much, I venture to assert, but charity, and very little of that from any Benevolent Fund connected with the gas industry.

It is no use mincing matters. We want a Union of some sort or another, to put a stop to this underselling, made inevitable by the trading instincts of the majority of gas proprietors, both private and municipal. And this can only be brought about by the forming of such a Union through the Gas Institution. If any man refuses to come under this Union, let him put up with the ignominy that such an outsider deserves.

ONE OF THE PRESENT.

Jan. 11, 1906.

From Non-Statutory to Statutory Condition.

SIR,—Referring to my letter of May 5, 1905 (published in the succeeding number of the "JOURNAL"), with respect to the claim made by the Commissioners of Inland Revenue for conveyance duty on the capital, &c., of a Limited Company when it becomes incorporated by Act of Parliament, I have pleasure in informing you that since that date we, together with several other Companies—notwithstanding the opinion of Mr. Dankwerts, K.C.—have not allowed this matter to lapse; and there now seems some reason to hope that our efforts have not been in vain.

There may be some companies similarly situated to ourselves in this matter, with whom I have not had any correspondence; and if this is the case, I shall be glad if you will allow me, through the medium of the "JOURNAL," to ask any such company who may be interested to communicate with me at once.

F. PATERNOSTER.

Gas Offices, Felixstowe, Jan. 8, 1906.

Water-Works Engineers and Lead-Poisoning.

SIR,—Will you kindly correct two slight errors in your report (in the issue for Jan. 2) of my remarks in the discussion on Mr. Baldwin Latham's paper on "Plumbism due to Electrolysis," at the last meeting of the British Association of Water-Works Engineers. In the twelfth line "nine years" should read "five years;" and in the thirteenth line "lead poisoning" should read "pitting."

I regret not having noticed Mr. Burch's letter in your issue of Jan. 9 until my attention was called to it yesterday; and I now hasten to correct the impression that lead-poisoning has ever occurred in connection with the water supply of Canterbury.

WILLIAM G. PEIRCE,
Borough Water Engineer.

Richmond, Jan. 12, 1906.

Hours and Wages at Carlisle Gas-Works.

At last Tuesday's meeting of the Carlisle Town Council, it was stated that the Gas Committee have under consideration an application by the Gas Workers and General Labourers' Union for improved hours and conditions of labour and wages on behalf of the men employed at the gas-works. Mr. Watson asked whether the employees were applying for an increase of wages or a reduction of hours. He did not think that the putting off of this matter from time to time was conducive to good management. From information he had, he thought the question could be easily arranged at very little expenditure. The men could work an eight-hour shift with practically one extra man instead of a boy. Something should be done to let the men know, so as to do away with the uncertainty which existed at present. Mr. Coulthard said that the matter would very likely be decided at the next meeting. The Committee wanted some information respecting certain things; and so soon as they had it, a decision would be arrived at. Mr. Clarke said he would like to know what the terms referred to in the minutes were; while Mr. Dalton thought the matter was one to be dealt with by the Committee, who would submit a recommendation in the usual way. Mr. Watson asked what information the Committee required. Was it the conditions under which gas-works employees were engaged in other towns? If so, he could supply it. Mr. Clarke said the Council ought to know the terms of the men's application. The matter would be still left to the Gas Committee. Mr. Phillips remarked that the occupation of the gas-works employees was toilsome; and if their lot could be rendered more tolerable by reasonable concessions, those concessions would be made. Fault had been found with the Committee for not putting information before the Council; but he pointed out that the course they had always followed in the Council was to allow Committees to deal with a subject in its entirety, and then come before the Council with a recommendation. If they did not follow such a course, their deliberations would be prolonged indefinitely. The minute of the Committee was confirmed.

Aberavon and the Gas Supply of Margam.—An agreement has been sealed by the Margam Urban District Council for a gas supply from the Aberavon Corporation, for public lighting, at 3s. 4d. per 1000 cubic feet, for ten years, with a minimum of £3 per lamp; that the Margam Council pay 5 per cent. on an estimated expenditure of £335 outlay for mains; and that when the full supply is laid on it be at 3s. 4d. per 1000 cubic feet, with a minimum of £600.

A Strange Gas-Light at Manchester.—Those who happened to be near the Manchester Exchange on Monday afternoon of last week were startled by the very unusual sight of flames bursting from the top of an overhead electric tramway pole. It appears that, in consequence of an escape near the base, gas found its way into the hollow of the pole, and then in some way became ignited at the top. As a result, the electrical equipment got so heated that it was deemed advisable to stop the passing of cars. The services were blocked for a short time; but the tower repairing waggon was quickly on the spot, and the flames were extinguished. The escape of gas turned out to be a serious one, and necessitated excavations on both sides of the roadway.

Halifax to Supply Ossett with Water.—Last Tuesday, the Halifax Town Council held a special meeting to discuss a recommendation of the Water Committee that the agreement between Halifax and Ossett, to supply the latter with water, should come into actual operation on June 1, 1907, on which date Ossett's present arrangement for water with the Dewsbury and Heckmondwike Water Board will terminate. It was stated that there was no reason to suppose that the Walshaw Dean reservoirs would not be completed by that date; and the Council unanimously decided to adopt the Committee's recommendation. The agreement with Ossett is that Halifax shall supply water for a period of twenty years, at the rate of 5d. per 1000 gallons; the minimum quantity being 2 million gallons, and the maximum 4 millions.

REGISTER OF PATENTS.

Gas-Burners.—Moreno, L., and D'Antony, A., of Turin. No. 29,475; Dec. 31, 1904.

This invention relates to apparatus "for the realization of the rapid and perfect combustion of any combustible gas." It is well known, the patentees remark, that in all cases where atmospheric air is mixed with gas and consumed the combustion is more or less hindered by the presence of nitrogen; and to remedy this drawback, their "invention" consists in effecting first the dissociation of the air into its principal components (oxygen and nitrogen) and then the separation of these two gases by chemical affinity.

In practice, the dissociation of the combustive air is to be effected by means of metallic and finely perforated walls, heated from the one side by the heat furnished by the combustion of the gas, while the other side of the walls comes in contact with the air for combustion, which is dissociated by contact with the incandescent wall; and "its oxygen, passing through the perforations of the wall, combines with the combustible gas and determinates the combustion of the latter."

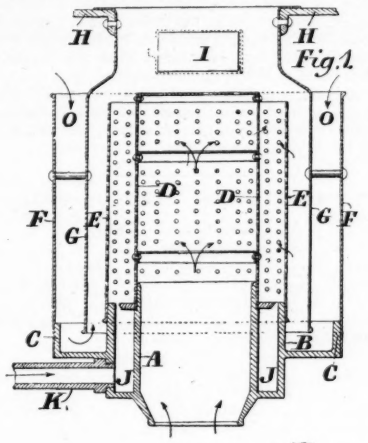


Fig. 1.

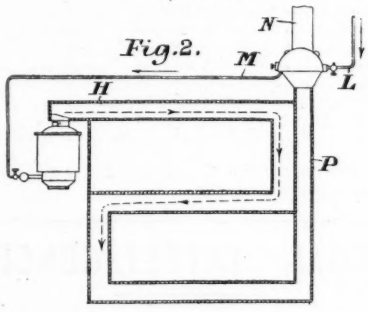


Fig. 2.

Fig. 1 is a central vertical section of the burner to be employed. Fig. 2 is an elevation of the complete apparatus; the device for utilizing the heat of the burned gases being shown in section.

The burner consists of a base formed by a central cylindrical part A, open at its ends, and two concentric cylindrical rings or galleries B, C, cast integral with A. On the parts A and B are fixed cylinders D and E, made of wire gauze or thin perforated metal. A third cylinder F, without holes, and concentric to the others, is joined to the part C of the base, and between them a fourth and non-perforated cylinder G is fixed by bolts. The upper end of the cylinder G is joined to a pipe or conduit H, forming a passage for the products of combustion. An ignition opening is formed in the upper part of the cylinder and fitted with a door I.

Near the upper end of the cylinder A, a plate is fixed, so that an annular opening is left between it and the upper part of the cylinder B. Thus a chamber J is formed. The combustible gas which can escape through the annular slit enters the chamber through a pipe K, to which it is conveyed by pipes L, M (fig. 2). The cylinder K is closed at the top by a plate; and at certain points of its height it is furnished with annular baffle-plates, in the centre of each of which is an opening.

When gas is admitted to the burner, ignition is effected through the door I. The flame produced occupies the whole annular space between the cylinders D and E, which in a few seconds become incandescent. In consequence of the suctional effect produced by a chimney of any kind—say, the chimney N (fig. 2)—the air is drawn through the inlet openings O and comes into contact with the incandescent sides of the cylinders D and E; and this air is separated into oxygen and nitrogen by the action of the heat radiated by the sides. "The oxygen passes through the small openings in the cylinders and mixes by affinity with the carbides of the gas, and causes the gas to be quickly and completely consumed; while the nitrogen escapes freely through the openings in the upper part of the cylinders without presenting any obstacle to the combustion which takes place in the space between the two cylinders."

The top of the central vertical cylinder prevents the air from escaping directly through that end of the cylinder. This air is completely utilized in the combustion.

"As soon as the air is dissociated into its elements, the flame disappears and is replaced by an enormous mass formed of a colourless and inodorous gas with a temperature of more than 500° C., the heat of which may be utilized in any kind of heating apparatus."

Fig. 2 represents, by way of example, the manner in which this heat can be utilized. Here, the products of combustion pass into pipes P, of greater or less length, arranged in a manner that is convenient and suitable to the use to which it is desired to put the heat. These gases are then driven out through the chimney N.

Recovery of Tar, &c., from Blast-Furnace and Other Gases.—Neilson, G., of Coatbridge. No. 28,508; Dec. 28, 1904.

This invention has reference to "the purification of, and the recovery of, tar, ammoniacal liquor, oil, and other substances from the gases of blast-furnaces, gas-producers, and the like, and rendering such gases suitable for use in gas-engines and for other purposes."

The gas is led from the source of supply into chambers fitted with apparatus, where it is regulated so that it issues only in a thin sheet or volume at a high velocity; and after issuing, it impinges against a metallic, wood, or like surface—preferably of tapered shape—where the tar and like products are deposited.

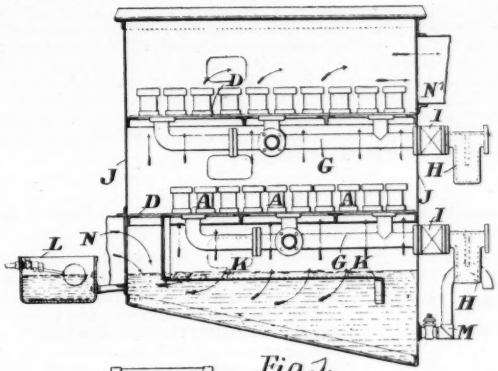


Fig. 1.

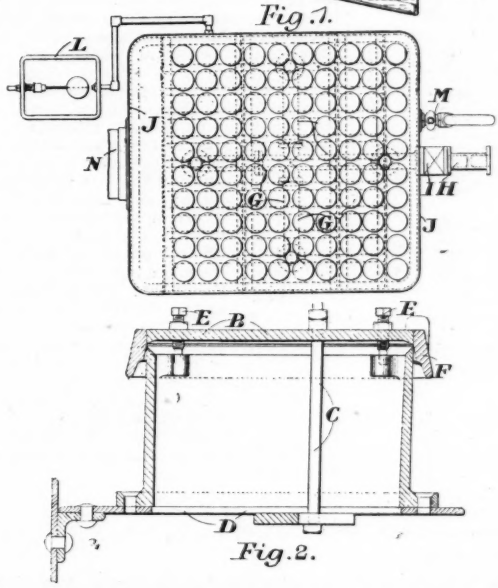


Fig. 2.

Fig. 1 shows an elevation and plan of the tar-trapping appliances combined with an oil-washer in connection with a gas-producer. Fig. 2 is a detached sectional elevation of a tar-extractor.

Referring first to fig. 2, it will be seen that the arrangement consists of a short vertical (preferably cylindrical) open tube having bearing flanges at its lower end, and formed tapered at the top.

The cover B (having its rim tapered the converse way) is held down or guided in position towards the tapered top of the cylinder by a vertical bolt C, projecting up from a horizontal bridge bar placed below the level of the platform D, and adjusted by a screwed nut. A series of screw-threaded pins E are fitted, at distances apart, round the cover, to bear on projections on the inner surface of the cylinder, so as to regulate the degree of opening for the escape of gas between the top of cylinder and the rim of the cover. The degree of exit-opening for gas which is found to answer best is preferably from one-fiftieth to one-sixteenth of an inch.

To the cover is attached, by supporting snugs, a downwardly projecting flange-baffle rim or hood F of conical or tapered shape, so that as the gas passes through the regulated openings between the top of the vessel and the cover it impinges on the inner surface of the flange, with the result that the tar and other substances held in suspension in the gas are deposited and separated from the gas, and, after being so trapped, are run away from the platform below D.

The tar and other products, after being deposited, are run away, as shown in fig. 1, by a pipe or channel G, with branch connections, to spaces between where the trapping appliances are placed. A syphon-shaped trap H is formed preferably by having a mid-feather or rib projecting down from the top and secured to a stopcock I on the main

tar-delivery pipe connection G to form a liquid seal and prevent the escape of gas.

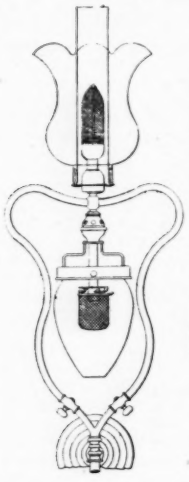
In applying the improvements in connection with a gas-producer, an oil-washer is combined with the tar-trapping appliance. As shown in fig. 1, this would preferably consist of a chamber located below the horizontal platform D within the outer housing vessel J, and containing a gauze diaphragm K submerged in creosote oil or other suitable solvent at the bottom of the vessel or tank, so as to dissolve the pitch retained by the gas before the latter emerged through the regulating orifice at the top of the tar-trap. The oil would be fed by a pipe from a cistern L, and the tarry matter or dissolved pitch would be drawn away by a tap M. The gas would enter by the branch N and pass away by the outlet N^1.

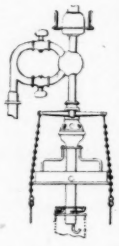
Gas-Stoves.—Sturges, R., of Watervleit, Albany, U.S.A. No. 937; Jan. 17, 1905. Date claimed under International Convention, Jan. 20, 1904.

This is a gas-stove having in combination a casing provided in its lower portion only with outlet apertures for the circulation of heated gases, and having its upper portion closed except for a vent-aperture; a valve for tightly closing the vent-aperture, whereby a closed chamber is formed in the upper portion of the casing; a gas-burner communicating with the lower portion of the chamber; a door giving access to the burner; the operating connections between the door and the valve whereby when the door is opened to light the burner the valve is opened to open the vent, and, when the door is closed, the vent is closed and escape of heated gases from the chamber is afforded only at the lower portion of the stove, and the closed chamber is adapted to contain a body of gas which serves as a cushion for the rapidly rising highly-heated gases from the burner.

Incandescent Gas Lighting.—Liebermann, L. S., of Mansell Street, E.C. No. 4677; March 6, 1905.

When an upright incandescent burner is employed, the light is mainly directed upwards, the patentee remarks, so that while the upper illumination is good, the lower illumination is defective, except when devices are applied to deflect the light downwards, when the reverse results obtain. With the other type of burner, the light is chiefly directed downwards, and, in consequence, the lower illumination is effective, whereas the upper is not. When, as is frequently desired, the upper and lower illumination are to be equally effective, this is attained by the use of the two kinds of burners mentioned; the burners being applied separately—that is to say, not on one fitting (except it be a chandelier) "which is inconvenient, clumsy, and expensive." One object of his invention therefore is to obtain, when required, efficient upper and lower illumination simultaneously in a "neat and simple" manner; and to this end he adopts an upright burner and an inverted burner, which are disposed in, or practically in, axial line (as shown) on an adaptor or support arranged to be connected to a suitable fitting, and furnished with a device for controlling the gas supply to the burners in such manner that both may be lit together, or either of them.





Manufacture of Gas.—Bell, H. P., of Mincing Lane, E.C. No. 6794; March 31, 1905.

This invention relates to apparatus for the manufacture of water gas or producer gas, or a mixture of such gases; the object of the invention being "to produce economically from coal, coke, or other suitable fuel, a gas having a higher calorific value than ordinary producer gas." For this purpose, heat is generated by a complete combustion of part of the fuel; and the heat so generated is utilized as completely as possible in the production of gas from the rest of the fuel, by distillation and by decomposition of steam, with or without the formation of carbon monoxide, by the partial combustion of the carbon in air. The products of the complete combustion are allowed wholly or in part to escape into the air; and the gases formed from the rest of the fuel are passed through layers of heated fuel before leaving the apparatus. It is, further, said to be the object of the invention to carry on the manufacture of gas, of varying composition and calorific value, continuously, without changing the direction of the flow of the gases through the apparatus, and with the least possible interruption during the moving of valves.

The apparatus to be used for the purpose is a modified form of that described in patent No. 2124 of 1905, which consists of three vessels, of convenient form and size, made of refractory materials. The vessels are connected together in series by means of tubes or passages provided with a suitable arrangement of valves, which can be so operated that, while the direction in which the gases pass through the apparatus is unchanged, the points at which the air is admitted and the gases are allowed to leave the apparatus are changed in such a way that each vessel in turn becomes first, second, and third of the series.

The three vessels are made of refractory materials and surrounded by spaces or jackets. The vessels and jackets are connected by tubes or passages provided with valves; and the valves can be so operated that each vessel in turn becomes first, second, and third of the series. Air, which may have been previously heated by passing through the jacket of the vessel, is admitted to the one which is for the time being first of the series; and the gases issuing from the vessel, instead of passing into the second vessel of the series (as in the apparatus described in the earlier patent), are made to pass through the jackets surrounding the other two vessels. Sufficient air is admitted to ensure complete combustion; and finally the gases are allowed to escape by a chimney. Steam, with or without admixture of air or of part of the gases from the first vessel, is admitted to the other two vessels in such quantities as may be desired; and the gases from the second vessel are made to pass through the third vessel before leaving the apparatus.

The movement of the valves may be made reversible. Fuel is preferably introduced at each stage into the vessel which is for the time being second of the series.

The connecting passage and valves may, if desired, be so arranged that the apparatus can be used alternatively in the manner described in the present patent, or as described in patent No. 2124—that is to say, in such a manner that the part of the apparatus in which combustion takes place is not (as in the present invention) separated from the part in which gas is generated, but the gases from the first vessel of the series pass through the other two vessels in succession, and not, as in the present invention, through the jackets which surround the vessels. The gases from all three vessels are, according to the earlier patent, collected together, and not, as in the present one, partly discharged by a chimney, with the consequent production of a larger quantity of gas of a lower calorific value than is secured when the apparatus is used in the manner described in the present specification.

While thus indicating the nature of his invention, the patentee wishes to make it clear that he does not restrict himself to the use of any form or construction of vessels, passages, or valves, nor to the use of fuel of any particular quality or composition.

APPLICATIONS FOR LETTERS PATENT.

14.—Fielding, J. A., "Gas-mains." Jan. 1.
20.—Bayer, A., "Analyzing gases." Jan. 1.
45.—Schmitz, W., "Inverted burner." Jan. 1.
120.—Green, B. K., and Mieville, H., "Generating gas." Jan. 2.
123.—Potter, W. G., "Inverted burners." Jan. 2.
185.—Anderson, D., and Scott-Snell, C., "Supplying gas or air under pressure for combustion." Jan. 2.
213.—Helps, G., "Globe-holders." Jan. 3.
227.—Sheldrake, J. H., and the Buhlmann Incandescent Syndicate, Ltd., "Inverted mantles." Jan. 3.
228.—Still, W. M., and Adamson, A. G., "Mantles." Jan. 3.
248.—Hacking, A. E., "Gas lighting." Jan. 4.
255.—Zucker, L., and Co., "Mantles." Jan. 4.
304.—Reichenbach, F., "Gas-engines." Jan. 4.
328.—Helps, G., "Lamps and burners." Jan. 5.
338.—Biheller, S., "Packing mantles." Jan. 5.
341.—Blumenthal, A., "Inverted lamps." Jan. 5.
344.—Chandler, S. & J., and Mullins, E. M., "Grids for gas-purifiers." Jan. 5.
436.—Thuman, F., "Refractory brick-work used in water-gas plants." Jan. 6.
438.—Max Durnberg and Co. G. m. b. H. and Olthoff, H., "Coin-freed gas-meters." Jan. 6.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—CHANCERY DIVISION.

(*Before Mr. Justice* Buckley.)

Friday, Jan. 12.

Knowles v. Metropolitan Water Board.

This was an action brought by Mr. Thomas Foster Knowles, the owner and occupier of a house and garden fronting on the Thames at Hampton, asking for an injunction to restrain the defendants from causing a nuisance by sending oil into the river from their pumping-station just above his premises, whereby it was alleged that great injury was done to his property, and its value seriously diminished.

Mr. Gore Browne, K.C., and Mr. C. E. Allen appeared for plaintiff; Mr. Danckwerts, K.C., and Mr. A. B. Shaw represented defendants.

Before the case was opened, Mr. Danckwerts said there was a summons for leave to put in an amended defence, which he understood had been, or would be, referred by the Master to his Lordship.

Justice Buckley said he knew nothing about the summons at present; but he would send for the Master, and in the meantime he had better hear what the nature of the case was.

Mr. Gore Browne accordingly read the statement of claim and the defence, in the course of which

Mr. Danckwerts said he should not insist upon two points raised therein—viz., that the defendants were entitled, either by prescription, or under statutory powers, to commit a nuisance. The real defence, apart from the question as to there being any nuisance in fact, was that the lubricating oil which it was said caused the nuisance, being discharged with the waste steam, was not discharged into the Thames by the defendants, but into the sewers of the Hampton Urban District Council, upon whom the duty lay of removing it before the sewers discharged into the river. It was this point to which the proposed amendment was directed.

The summons for amendment was here produced; and, after a short discussion as to the terms on which it should be allowed,

Justice Buckley said the plaintiff must, of course, be protected with regard to the costs thrown away, and have an opportunity of meeting

the new case made; but, subject to this, he thought the amendment should be made.

Mr. DANCKWERTS, after consultation with his clients, then formulated the new defence, as follows: "None of the oil referred to in the statement of claim ever passed into the River Thames, other than such oil as passed through sewers vested in the Hampton Urban District Council and its predecessors in title, the sanitary authorities acting in execution of the Public Health Acts, or through sewers of the other sanitary authorities of the districts in which the works are respectively situated, into which sewers the oil passed mixed with water, being drainage from the defendants' or their predecessors' works. Such drainage has been gradually, as works could be erected, wholly cut off from the sewers, with the exception of certain bilge drainage; and the cutting off was completed by August, 1905. The bilge water has been freed from oil before being turned into the sewers since a period before the commencement of this action."

It was further arranged that the defendants should within four days furnish particulars of the sewers referred to (and allow inspection of the same), and an amended defence, omitting the points not now relied upon, and including the above paragraph; the plaintiff to have seven days to reply, and the action to be adjourned to the 26th inst.

SULPHUR IN GAS AT TOTTENHAM.

At the Tottenham Police Court last Thursday, the Tottenham and Edmonton Gas Company were summoned, at the instance of the Tottenham District Council, for supplying gas containing an excess of sulphur on Nov. 15 and 29 last year. Mr. Richardson appeared for the Council; Mr. W. E. Windsor represented the Company. After the cases had been called on, Mr. Windsor applied for an adjournment. He said a similar summons was before the Court on the 26th of October, and, as the result of six summonses, an accumulative penalty of 10s. only was inflicted. He now desired to call evidence to show that there was no danger to health, or anything of the sort, owing to the presence of the excess of sulphur complained of, and that therefore no penalty should be inflicted. It was necessary that this evidence should be of an expert nature, and of the highest possible character. They intended to call Professor Lewes, who would have been in attendance that day but for the fact that he had received instructions from the Admiralty to be present at some torpedo boat trials. Mr. Richardson said that he had brought an expert at considerable inconvenience. The matter was gone into on the previous occasion, and he did not see what defence there could be. He saw no reason why the summonses should be adjourned merely to show that the Act of Parliament ought not to be enforced. The Bench said they would hear the Council's expert. Mr. Richardson added that each of the two summonses was issued in respect of the last day of separate periods of six days. Mr. Arthur Edgecombe Brown, B.Sc., F.I.C., the Council's Official Gas Examiner, gave the results of his tests during the two separate periods, showing the quantity of sulphur in 100 cubic feet of gas to have been: Nov. 9 and 10, 24·9 grains; Nov. 11, 23·1 grains; Nov. 13, 24·4 grains; Nov. 14, 29·2 grains; Nov. 15, 28·9 grains—giving an average for the six days of 25·9 grains, or 5·9 grains in excess of the quantity permitted; Nov. 23, 21·5 grains; Nov. 24, 20 3 grains; Nov. 25, 23·7 grains; Nov. 27, 24·3 grains; Nov. 28, 23·1 grains; and Nov. 29, 23·2 grains—being an average of 22·68 grains, or 2·68 grains in excess. Witness said the method under which he made the tests was that prescribed by the Metropolitan Gas Referees; and he reported to the Company the results of the tests each day. Mr. Windsor did not ask the witness any questions; and the case was adjourned until next Thursday.

INCANDESCENT MANTLE LITIGATION IN AUSTRALIA.

In the Supreme Court, at Melbourne (Victoria), on the 5th ult., Mr. Justice Hodges delivered a reserved judgment in an incandescent mantle patent case, the hearing of which, in September, occupied several days. The action was brought by the Welsbach Company of Australasia against Mr. Robert Lascelles, a merchant. The plaintiffs claimed to be the owners of a patent dated 1894 for "hoods for incandescent burners," which defendant infringed by selling and using "Vivid" mantles, not of their manufacture, and only colorably differing from theirs. They sought an injunction, £1000 damages, and the confiscation of the mantles complained of. The defendant denied the acts complained of, and attacked the patent on a number of grounds as invalid. He also alleged prior publication, and said that the invention was publicly used in Victoria prior to the granting of the Victorian letters patent.

In the course of his judgment, Justice Hodges said the plaintiff Company came into existence on March 14, 1893; and about twelve months later a patent was issued to them in Victoria, in respect of an invention for "an improved hood for incandescent gas-burners." The plaintiffs alleged infringement of this patent; while the defendant said there had been prior public use of the invention in Victoria by Messrs. James M'Ewan and Co. and the Metropolitan Gas Company. In support of defendant's case, a Mr. Lacey, employed by the former firm, stated that in May, 1893, several hundred mantles came into their hands from England, and a number were used in the warehouse and in the window for six months. These mantles were similar in effect to those of the plaintiffs. Lacey said that he sold numbers in 1893 and 1894, both before and after March. Mantles manufactured according to plaintiffs' patent were in use in the Metropolitan Gas Company's premises from before June, 1903. Mr. Lewis and Mr. White, of the Metropolitan Company, who gave evidence, were, in his opinion, honest witnesses; and he found, therefore, that there was a prior use of the invention in Victoria by Messrs. James M'Ewan and Co., and persons to whom they sold them, commencing about May, 1893, and by the Metropolitan Gas Company before June, 1893. It was contended that, even if this were so, plaintiffs' invention was never disclosed—that although the public might have seen the light, yet this did not disclose to them how the mantle was made; and that unless there was a user which disclosed to the public how the mantle was made, there was no disclosure of the invention, and plaintiffs still possessed their secret. If a person possessed some secret process by which a known article was produced, and if the process was not discoverable from an examination, scientific or otherwise, of the article produced, he (Justice Hodges) was not sure that it had ever been decided that a person lost his right to procure a patent by reason of his having manufactured that which was known, by his secret process, and having sold one of such articles. If, for instance, a man had manufactured a dye by some secret process, and had made one sale of the dye so manufactured, but the person to whom it was sold could not discover by what process or of what material the dye was made, and the assistance of an analytical chemist did not enable him to discover the secret, he did not think it had ever been decided that such a sale would defeat the subsequent grant of letters patent. But he was of opinion that, if an article were sold, and if the purchaser on looking at it could see how, and of what, it was made, or if an analytical chemist, without experiment, but in the ordinary exercise of his calling, could say how, and of what materials, the article was made, such sale would defeat the subsequent patent. On behalf of the defendant this contention was relied upon. The material—the incandescent mantle—was before the public and in public use prior to the date of the patent; and the process of the invention was also necessarily before the public, because the article in itself presented such means of knowledge to the public as to enable anyone of ordinary competence to reproduce the article. The process by which these mantles were made was, of course, well known to the public, and had been the subject-matter of other patents; and the only novelty in this mantle was in the materials of which it was composed, and the proportions in which these materials were combined. Any analytical chemist, in the ordinary conduct of his business, and without experiment, but simply by analysis, could discover the material and other proportions and reproduce the article; and, consequently, in his opinion, the publication of the material was substantially a publication of the invention. The mantles were made by other persons besides the plaintiffs; but while defendant denied infringement, the point was not argued. If he had held that the patent was a valid one, he would have found that there was infringement. There would be judgment for the defendants, with costs; the plaintiff to have the costs of the issues other than that of prior publication.

Prepayment Meter Thefts.

For "burglariously breaking and entering" a house, and stealing 4s. 2d. belonging to the Portsea Island Gas Company, a labourer, named Stears, was tried at the recent Portsmouth Quarter Sessions. The prisoner was a friend of the tenant; and on the evening in question he went with him and his wife to a public house. There he left them; and later on a police-sergeant found him at the house, with the gas-meter broken open. The Recorder informed the Jury that it was very doubtful whether a burglary could have been committed by the prisoner, as he was in the house by permission of the landlord. As, however, he had entered a lodger's room, the charge of house-breaking could be made out. It was significant that the prisoner, when arrested, had in his possession almost the identical sum in coppers taken from the gas-meter. Prisoner was found guilty of housebreaking, and sentenced to six months' hard labour. At the Norwich Guildhall, last Wednesday, Henry Saunders, a wheelwright, was summoned on the information of Frank Balls, superintendent of the prepayment meter department of the British Gaslight Company, for improperly using the gas supplied to him by the Company between Oct. 1 and Dec. 31. Defendant pleaded not guilty. It was stated that wherever defendant had resided, and there happened to be a slot meter, a certain amount of gas had always been obtained improperly. On the present occasion, there was a shortage of 7s. 9d., owing to a number of cardboard discs having been placed in the slot. Mr. Balls, in his evidence, said that Saunders had called upon him and offered, for 5s., to show him how it was possible to obtain gas without putting a coin in the slot. The defendant made a statement on oath to the effect that the cardboard in the meter must have been put there by the children. The Chairman remarked that the Bench were satisfied the meter showed a deficiency, and consequently gas had been improperly obtained. They would impose a fine of 20s. and 9s. costs, or fourteen days.

Withdrawal of the Hitchin Gas Purchase Bill.—At the meeting of the Hitchin Urban District Council on Wednesday, a petition signed by 107 ratepayers was presented, asking that a poll of the town might be taken on the question of the purchase of the Hitchin Gas Company's undertaking; but having regard to the emphatic disapproval of the proposal which had previously been expressed by a representative meeting of ratepayers, the Council declined to comply with the petition. Consequently the Bill deposited by the Council for the purchase will be withdrawn.

Suffocated by Coal Gas.—In a bed-room of a private hotel in Arundell Street, Coventry Street, Leicester Square, two children—a boy aged eight and a girl aged twelve—were found dead last Friday, having been asphyxiated by coal gas. Their mother was lying unconscious beside them, and was removed to Charing Cross Hospital; and it was considered doubtful whether she would recover. The lady and her two children arrived at the hotel on the previous evening. She gave the name of Murray, and stated that she had come from her home in the country to show her children the sights of London. As she could not be aroused by the servant, and owing to the smell of gas, the door of the room they occupied was forced, and the bodies were discovered. A gas-jet in the room had been turned on fully. An inspection of the room was made later by the police. They found the window securely fastened and the crevices plugged with paper and rags. The keyhole of the door had also been stopped up. Correspondence which was found in the possession of the woman indicated that her real name was Milner, and that she resided at Burgess Hill.

MISCELLANEOUS NEWS.

SULPHATE OF AMMONIA MARKET.

Messrs. Bradbury and Hirsch's Review for the Past Year.

We have received from Messrs. Bradbury and Hirsch, of Liverpool, a copy of their "Review of the Market for Sulphate of Ammonia during 1905;" and, as on previous occasions, we extract from it those portions which most closely concern our readers.

Before proceeding to review the markets for sulphate of ammonia and nitrate of soda, Messrs. Bradbury and Hirsch follow their usual practice of offering a few observations upon business and manufacture in general, and particularly upon the fertilizer trade. They point to the gratifying fact that in the course of the year there was a decided improvement in most branches of industry, and a corresponding one in commerce. The coal, iron, and steel trades were exceptionally busy; and there was similar activity in all industries dependent upon, or connected with, them. The year's shipbuilding was a record; and 1906 promises to be equally good. Compared with recent years, the shipping interest was prosperous; and this may be taken as witness to the increasing magnitude of the world's commerce, though unfortunately not affording proof of the profitableness of it.

After a few remarks on sugar and wheat, Messrs. Bradbury and Hirsch deal with the manure trade, in which there was great activity last year. Though the limit of consumption on the older ground has probably been nearly reached, the need for fertilizers in new countries is becoming more fully recognized; and year by year the export business is becoming more and more important. Manure manufacturers are quite alive to the world's increasing requirements in the way of superphosphates; but they do not see a corresponding increase in the sources of supply of the raw material. They have, therefore, not hesitated to purchase a large portion of their supply of phosphate rock for two, and even three, years ahead, at slightly hardening prices, though as yet no serious attempt has been made to advance the prices of manufactured manures. Of course, the use of superphosphates involves a proportionate use of nitrogenous manure; and therein lies the interest of the sulphate of ammonia trade. So far, Australian requirements have been met by home production of sulphate; and there has even been some export of this article. But small shipments of British make have gone to the Cape, and there is promise of development in this direction. So far as Europe is concerned, large purchases of sulphate have been made for delivery over the spring months—it being realized that prices have been relatively cheap; but consumers and distributors have for the most part left nitrate of soda alone, partly owing to its relative dearness, but mainly because they have thought that the high level of prices demanded was not justified by the actual situation.

Coming to nitrate of soda, Messrs. Bradbury and Hirsch briefly restate the situation at the end of 1904, and go on to review the course of the market. They show that at the end of last year the visible supply (stock and afloat) for the United Kingdom and the Continent was about 668,000 tons, compared with 672,000 tons in 1904 and 640,000 tons in 1903. So that the present visible supply is 4000 tons less than it was at the end of 1904. But before any attempt can be made to draw any profitable conclusions from the present situation, it is necessary to take into account probable shipments by steamers and sailing vessels to be made in the current year in time to arrive before the end of April, and to ascertain as nearly as possible what the actual supply for Europe is likely to be. The determining factors are unfortunately so much less certain than they have been in recent years, that it cannot be hoped to do more than make an approximate estimate. Last year Messrs. Bradbury and Hirsch added 100,000 tons to the visible supply in order to get at the probable actual supply for January-April. There was then every reason to strain every nerve in order to make shipments early in the year as large as possible. There was a high-level of prices ruling at the time, there was every probability of a largely-increased demand for beet culture, and there was some misgiving about the possible action of the Nitrate of Soda Committee and its effect upon the market after the spring season. The authors point out that the present situation differs in several material points from that of twelve months ago, though in some important particulars the two are much alike. The visible supply, for example, is about the same, and there is not much difference in the level of prices. On the other hand, the price of sugar is down to the level of two years ago, and they think there is bound to be a return to the cultivation of cereals and other crops, involving a smaller consumption of nitrate of soda. Moreover, increased production of sulphate of ammonia on the Continent must, so far as it goes, tell against increased consumption of nitrate of soda, since it is relatively much cheaper and can readily be substituted there. These seem to be the main factors bearing upon the question of shipments to Europe in the early part of the present year; but there is another that cannot well be ignored, and that is the demand for the United States. The largely increased shipments in the second half of 1905 have already had the effect of curtailing shipments to Europe, and Messrs. Bradbury and Hirsch are of opinion that they must, if continued, have a like effect over those in the approaching months. The point is, will they be continued on an increased scale? They think not. They have reason for believing that the extra requirements of the United States have been provided for, and that near shipments are not likely to much exceed the normal; so that in the demand from the other side of the Atlantic they do not anticipate anything to further disturb the European situation.

On the subject of sulphate of ammonia, when discussing the situation a year ago, Messrs. Bradbury and Hirsch gave it as their opinion that the advance in price from £11 15s. per ton at the end of September to £12 12s. 6d. per ton at the end of December was justified by the strong position of nitrate of soda and by the prospective moderate supply of sulphate of ammonia. Counting upon an increased demand for Japan and the sugar-growing Colonies, they expressed the further view that the prompt price seemed likely to approximate to that for spring delivery, which at the time was fully £13 per ton. The nitrate of soda position seemed to be well assured, and sulphate of ammonia was relatively much the cheaper article; and though, owing to increasing German production, they hardly expected much, if any, increase in demand from Germany, or from the United States for the same reason, they thought increased Colonial and Japanese requirements would absorb any increase there might be in the production in the United Kingdom over the spring months. The course of the market followed very closely the line they indicated, but from causes they had not counted upon. There being no special demand, prices were barely maintained up to the third week in January, when the declaration of a general strike at the collieries in the Bochum district in Germany completely altered the situation in the sulphate market. It was impossible to determine how long the strike might last; and as the dislocation of the coking industry in the district—much the largest source of German sulphate production—was involved, German buyers were obliged to look elsewhere for supplies for near delivery. Accordingly heavy purchases of British production were made in January and early February for delivery over the near months for German account; and before the end of January the spot price had advanced to £13 2s. 6d. per ton f.o.b. Hull.

In February, however, the strike came to an end, through Government intervention, and prices eased off. But buyers, with spring requirements upon them, not having been able with any degree of certainty to count upon this, had already committed themselves heavily, as a protective measure; and the increase in shipments to Germany in February and March was the most important factor in saving the market from complete collapse. Additional shipments to Japan and the Colonies, though highly satisfactory, would have been in themselves quite inadequate for the purpose of sustaining prices at even the opening level.

At this point in their report, Messrs. Bradbury and Hirsch give four tables of exports, which show the fluctuating character of the demand for sulphate of ammonia from different sources. The first table—that for the three months from January to March—does not call for comment. The second—January to April—shows that while in April shipments to Germany shrank to about the 1904 level, those to Spain and the Colonies in the same month dropped about 4000 tons. Without any compensating increases in shipments to other countries, the authors say it was impossible that the market could stand up, especially in the face of increasing production; but the abstention of buyers, more especially of Spanish buyers, was rather overdone at this time. In May, it became obvious that stocks in buyers' hands had been reduced to an inconvenient minimum—a policy induced by persistent speculative selling ahead at a discount on spot prices for the time being. On reference to the third table—for the six months January to June—it is found that shipments to Spain in May and June increased no less than 5331 tons, and those to the Colonies and other countries (including Japan) 2941 tons—together, 8272 tons. On the other hand, there was a falling off in Continental requirements of 2486 tons—supplied by home production—and in those for the United States, Italy, and the Canaries of 2037 tons—together, 4523 tons. So that, though there was, on the whole, an increase of 3749 tons in the exports during May and June, it did no more than absorb the surplus stock in the hands of makers brought forward into May, and any increase in production within the two months. Consequently, the market was not able to do more than maintain its equilibrium, though prices were all the time relatively much cheaper than those for nitrate of soda.

Turning to the second half of the year, the reader is confronted by two outstanding factors among others of only less importance. He finds an altogether phenomenal increase in exports to Japan to set against a remarkable shrinkage in Continental requirements. Formerly Japan received large quantities of fertilizing material in the shape of bean-cake from Manchuria. But during the past two years this material has only been obtainable in diminished quantities, owing to the war; and sulphate of ammonia has become the main substitute for it. Reports have been circulated, and contradicted, that importers of sulphate have overshot the mark—that they have over-estimated requirements. Whatever the truth may be, Messrs. Bradbury and Hirsch say it is certain that buying for the Japanese market culminated in October, and that orders for this destination have since been exceedingly scarce. The heavy shipments in November and December have been made against existing contracts, some of which are understood to extend over the early months of the current year. Continental requirements have declined from an increase of 5956 tons at the end of June to an increase of 514 tons at the end of December. The shrinkage has been in shipments to France and Belgium; and although the authors attribute this mainly to increase in German production, which has all along been supplying the North of France, they think it has been partly due to increased production in that country. Of scarcely less importance is the fact that shipments to Spain and Italy from July to December fell from 21,702 tons in 1904 to 17,643 tons in 1905. The following were the shipments for the year: To France, Germany, and Belgium, 42,206 tons; to Spain, Italy, and the Canaries, 52,707 tons; to Holland, Java, British Guiana, the West Indies, and the Mauritius, 47,575 tons; the United States, 4469 tons; other countries, 42,392 tons (Japan taking 33,861 tons, against 14,981 tons in 1904 and 3612 tons in 1903)—making a total of 189,349 tons, against 177,287 tons in 1904, 162,217 tons in 1903, 162,754 tons in 1902, and 150,203 tons in 1901.

The only other matter in this connection to which Messrs. Bradbury and Hirsch deem it necessary to call attention is the decline in shipments to the United States, because it means that for the present the Eastern States have become practically independent of the United Kingdom market. They think that these factors supply a sufficient clue to the course of the market during the past six months, and that together they account for the depression which set in with November. At different times, and more particularly when the Japanese boom was on, the Scotch oil companies and the large London makers made heavy sales for delivery over the spring months at full prices, so that they are approaching the spring season very comfortably placed. Since the decline in the spot market in November, prices for forward delivery have had to be modified; but the bulk of recent business abroad has been taken speculatively at prices which makers would not look at. At

the close, however, there is more inquiry from abroad for near months; and this would seem to indicate that speculators have begun to "trim," and are unwilling to go on at prices recently accepted. The closing spot price, f.o.b. Hull, was £12 5s. per ton; and the average price for the year £12 10s. 9d. per ton, or 7s. 1d. per ton above the average price for 1904. Against the average price of nitrate of soda—£10 15s. 10d. per ton—Messrs. Bradbury and Hirsch think it must be admitted that sulphate of ammonia makes a very poor show; but when all the facts of the case are taken into account, they consider that makers have much reason to be satisfied.

The next portion of the report is that in which our readers are more especially interested. It deals with the output of sulphate of ammonia from gas-works, which Messrs. Bradbury and Hirsch point out has become almost a stable quantity in recent years, owing partly to the extension of electric lighting, but mainly to the increased use of water gas; and, notwithstanding the greater activity in the manufacturing industries during the past year, the increase in the yield of sulphate was not more than 1500 tons. There was a further substantial increase from carbonizing works, more particularly in the Tyne district, amounting, it is estimated, to 5000 tons. Further installations and extensions of the Mond power-gas process brought the output of sulphate from this source up to 13,000 tons—an increase of 4000 tons within the year. The effect of the installation of new plant by some of the Scotch oil companies was mainly felt in the production of sulphate in 1904; and the increase in 1905 is not estimated at more than 500 tons, while the activity in the iron trade accounts for an increase of about 1000 tons. Messrs. Bradbury and Hirsch estimate the production of ammonia, calculated into sulphate (including that used in the manufacture of ammonia soda and for other chemical purposes), from all sources in the United Kingdom, during 1905 at 257,500 tons, apportioned as follows:—

	Tons.
Gas works	151,500
Iron ,,	20,500
Shale ,,	43,000
Coke and carbonizing works and producer gas	42,500
	257,500

Of this production, they reckon that England contributed 171,400 tons; Scotland, 83,500 tons; and Ireland, 2600 tons. The output (in tons) during the previous five years was as follows:—

	1904.	1903.	1902.	1901.	1900.
Gas-works	150,000	150,000	150,000	143,000	142,000
Iron ,,	19,500	19,000	18,500	16,500	17,000
Shale ,,	42,500	37,500	37,000	40,000	37,000
Coke and carbonizing works and producer gas	33,500	27,500	23,500	18,000	17,000
Totals	245,500	234,000	229,000	217,500	213,000

The authors' estimate of production from all sources during 1904 proved to be within 1000 tons of the actual quantity; their over-estimate from gas-works being about balanced by an under-estimate from other sources. They were about right in regard to the stocks in the hands of makers at the end of the year; and, on this assumption, the account for 1905 will stand as follows:—

	Tons.
Stock brought forward from 1904	11,000
Production in 1905	257,500
	268,500
Exports in 1905	189,000
Home consumption (for all purposes) in 1905	68,000
Stock to carry forward into 1906	11,500
	268,500

Messrs. Bradbury and Hirsch remark that although production from gas-works does not, for reasons already referred to, admit of much expansion year by year, a substantial increase in the output from carbonizing works in the Tyne district must again be counted upon, and some increase from power gas and also from blast-furnaces; but from shale-works the capacity of present plant has probably been nearly reached. Therefore, notwithstanding improved trade, they do not see that production from all sources in the United Kingdom in the present year can increase at nearly the same rate as it did in 1905, though the improvement will probably be greatest in the early months. They admit that they cannot see sufficient to justify a recovery in values such as was experienced in the early part of 1905. But relative cheapness may occasion a larger Continental demand than they at present anticipate; and, in any case, they look for a substantial recovery from the extreme depression which prevailed last month.

The "Review" concludes with the usual record of the course of the market month by month; and this is followed by the customary tabulated statistics. The first table contains the comparative weekly prices of sulphate of ammonia and nitrate of soda last year. In the week ending Jan. 7, sulphate was 12s. 7½d. per cwt. and nitrate 11s.; on April 1, the prices were 12s. 6¾d. and 11s. 1½d.; at Midsummer, they were 12s. 6d. and 10s. 10½d.; at Michaelmas they were 12s. 6d. and 10s. 6d.; while at the close of the year they were 12s. 3d. and 10s. 9d. respectively. The second table shows the average prices per cwt. of 95 per cent. nitrate of soda, in Liverpool, for the past ten years. They are as follows: 1896, 7s. 11½d.; 1897, 7s. 9¼d.; 1898, 7s. 6¾d.; 1899, 7s. 11¾d.; 1900, 8s. 5½d.; 1901, 8s. 11½d.; 1902, 9s. 4d.; 1903, 9s. 6½d.; 1904, 10s. 2½d.; and 1905, 10s. 9½d. The third table gives the average prices per ton of good grey (24 per cent.) sulphate f.o.b. Hull; the figures ranging over 39 years—1867 to 1905. The following are the averages for the past ten years: 1896, £7 18s.; 1897, £7 18s. 5d.; 1898, £9 9s. 7d.; 1899, £11 5s. 10d.; 1900, £11 2s.; 1901, £10 11s. 4d.; 1902, £11 16s. 3d.; 1903, £12 9s. 2d.; 1904, £12 3s. 8d.; and 1905, £12 10s. 9d.

As the result of the recent rains, the water in the Leicester reservoirs has increased by over 150 million gallons; but the deficiency in the storage is, of course, still serious.

ABERYSTWYTH GAS PURCHASE BILL DROPPED.

At the Town Hall, Aberystwyth, last Wednesday, a public meeting was held to receive the report of five gentlemen who had been appointed to consult with the Corporation Committee as to the advisability of proceeding with the Bill for the purchase of the gas undertaking. The Town Clerk read the report of the Committee, which advised the electors not to go on with the Bill, owing to the Corporation being unable to ascertain the price at which the Company were prepared to sell, and it being considered unwise to face the risks of arbitration. The Committee added that in their opinion the action taken by the Town Council up to that date had been desirable and necessary. The report was received with loud applause; and Mr. Roberts, a member of the Committee, said that they did not intend to reflect in any way upon the action of the Council. They were agreed that it was desirable to have the undertaking in their hands if the price was one they could approve; but they were equally opposed to going to arbitration in order to secure it. Mr. Edwards inquired whether they could, even if the price was a reasonable one, afford to hand over the management of the gas-works to the Town Council? He did not wish to cast any reflection on individual members; but collectively they in some way or other seemed to neutralize their good points. He wanted to know whether they could hand it over to a Committee of men outside the Council. There were men outside who considered themselves too good to be on the Council.

In answer to this, the Town Clerk (Mr. A. J. Hughes) said he was quite certain of one thing, that Mr. Edwards had never studied the Board of Trade returns as he had done lately, particularly in reference to gas undertakings taken over by municipalities. There might have been three or four cases which had not paid out of the large number of concerns taken over—mainly owing to bad management, excessive capital, and price of gas. He hoped they would have some figures given them that night; but if Mr. Edwards or anyone else could see figures which he had, showing the immense advantages of municipalities acquiring gas undertakings, after agreeing as to the price, there could be no question whatever as to their taking over the gas-works to-morrow. There was no set of accounts where it was easier to detect bad management and leakage, and there was nothing more simple than to find out who was responsible. There could be no risk in corporation management. If he was asked whether the private company or the municipality was most economic, he would say the municipality at once—for one reason that there were no Directors' fees to pay. The Directors had now to be paid salaries—not a large salary; but it was growing. They had nothing a little time ago. There were also many other points which it would not be advisable to discuss at present; but if he had a longer opportunity, he thought he could convince Mr. Edwards that there was no foundation for his fears. Mr. Edwards, remarking that he feared he had been misunderstood, repeated his question. The Town Clerk replied that there would be nothing to prevent the Corporation from handing over the management to a small Committee; but it would have to be called by such a name as a Board of Managers. Then, he feared, it would be a case of too many cooks who would spoil the broth.

After several other gentlemen had spoken, Mr. J. Gibson, a member of the Council, said he thought the ratepayers did wisely when they appointed from their midst five gentlemen to help in deciding the question. On the Committee they were unanimous that they would not go to arbitration. Before the ratepayers appointed the Committee, the Committee of the Council went down to the Company, and said, "Will you sell?" The Company said distinctly, "We will not sell. We will not give you a price. We do not want to sell." Private members, in their private capacity, had gone to private sources. Strings had been pulled in every way. The answer was, "We do not want to sell. We will not name a price." What was there between this and arbitration? The town had enough difficulty in managing what it had got now, without going into an expenditure of another £60,000 or £80,000 on a concern about which they knew nothing. The point they had to decide was that the Gas Company had refused absolutely to name a price; and the only alternative was to go to arbitration.

The Mayor then put the resolution to proceed with the Bill; and not a single "Aye" replied. The Bill will therefore be dropped.

BIRMINGHAM GAS COMMITTEE AND IRONMONGERS.

The Supply of Fittings and Stoves.

On Monday last week, a deputation from the Ironmongers' Association and the Master Gas-Fitters' Association of Birmingham had an interview with the Gas Committee of the Corporation on the subject of the sale of gas fittings and stoves. The Association had previously sent a requisition to the Committee asking them to stop the sale and fixing of fittings, and the doing of internal work from the outlet of the meter, not to use their show-room for the sale of fittings, and not to let out on hire ring burners, grillers, or heating stoves (other than cookers), or sell these goods at less than 25 per cent. profit. The Associations pointed out that their members were prepared to render the Gas Department all the assistance in their power as agents over the city and its boundaries, push the sale of gas appliances, exhibit the goods as far as possible in their show-rooms and windows, and do all in their power to increase the consumption of gas. They were also prepared, representing as they did the "trade," to give every facility to the Corporation in advancing the sale, hire, and fixing, of gas-cookers. They trusted the Committee would give this matter their serious attention, appreciate the injustice caused by this unfair competition, and see their way to accede to the moderate requests put forward, which meant so much to every individual member of the two Associations.

Sir HALLEWELL ROGERS (the Chairman of the Gas Committee), in opening the proceedings, said the Committee had received from the Joint Associations a letter containing the grievances under which their

members informed the Committee they suffered through the trading of the Corporation. The concessions they asked were certainly a "large order;" and he should be glad to hear from the deputation the justification they had for asking his Committee to discontinue what they had been so long doing.

Mr. R. H. SMITH, the General Secretary of the Ironmongers Federation, in introducing the deputation, stated that they asked for the discontinuance of certain work, on the broad principle that municipal trading was unfair and unjust to them as ratepayers. The Corporation compelled them to pay their rates, and the money thus obtained from them was actually used to destroy a large part of their business. The severe competition they had to contend with through the Corporation selling at low prices and doing work made it utterly impossible for them to compete successfully. It was well known that a private individual, in taking a house and applying for a supply of gas, was induced to have his fittings put in and the work done by the Corporation. If not absolutely asked for the work by the servants of the Corporation, there was a feeling in the mind of an applicant that while at the Gas Offices he might get all his internal work done by the same workmen who were sent to connect the gas. He pointed out that in these times, when rents and rates were so heavy, the shopkeeper felt keenly the additional burden put upon him by the competition of municipal trading. If it was considered imperative to trade municipally, all ratepayers should be treated alike, and the ironmonger and gas-fitter should not be singled out, while the butcher, draper, and others were allowed to go scot-free. He strongly appealed to the Committee, who were most of them engaged in the trade of the city, to put themselves in the same position as the ironmongers and gas-fitters, and look at the matter from their view, as well as from that of other traders.

The CHAIRMAN said the deputation must remember that the Committee were only trustees for the ratepayers, and that the Corporation bought the gas-fitting business when they took over the gas undertaking in 1876.

Mr. SMITH said the deputation quite appreciated this; but it was only right that the Committee should take into consideration the fact that now the traders were, as ratepayers, finding the capital for the Committee to trade with, and were not doing so before, when the gas and fittings undertaking was in the hands of a private Company.

The CHAIRMAN remarked that the Committee were doing less trade in gas-fittings by some £3000 than they did formerly.

Mr. SMITH said this did not affect the question; and he thought when such a statement was made it should also be mentioned that this condition was brought about by the competition of electric lighting. Many of the better-class shops and houses which were formerly fitted with gas appliances and chandeliers were now using electric light.

Mr. C. BREEDON said the Master Gas-Fitters' Association had been formed with the object of agitating, both before the Committee and, if necessary, the City Council, to stop municipal trading in their goods and competition with their work. The last time the matter was before the Council, their proposals were only defeated by two votes; and they were again present to enter another protest against what they considered was unfair competition.

Mr. H. SMITH said he had felt very keenly the competition of the Corporation; and he cited an instance, which he stated was only one of many, where goods could be bought at the show-rooms of the Corporation cheaper than they could be obtained from manufacturers.

Mr. BREEDON said he had experienced the severe competition of Corporation work, and was suffering the loss of trade on account of it.

Mr. S. J. MILLS said the growth of municipal trading was becoming such an intolerable burden upon the private trader and retail shopkeeper that the time had now arrived for them to speak out in no uncertain voice; and he hoped that, as most of the Committee were engaged in the trade of the city, they would have some sympathy for those whose businesses were so deeply affected.

Mr. R. H. SMITH appealed strongly to the Committee, if they could not see their way to grant all the concessions asked for, to make some advances to the trade. He informed them that they had lately made a fair and equitable agreement with the Gas Committee of the Nottingham Corporation, who had appreciated the difficulties under which the trade suffered, and had made arrangements which enabled ironmongers and gas-fitters to carry on work, and obtain a fair profit whereby to pay their rates.

The CHAIRMAN said the Committee would carefully consider the propositions put before them, and would communicate their decision shortly.

The Committee were then thanked for their courteous attention to the remarks made, and the deputation retired.

FATAL ACCIDENT AT THE BECKTON GAS-WORKS.

The Danger of Disobeying Orders.

Last Tuesday, Mr. G. E. HILLEARY, the Coroner for West Ham, held an inquiry at the Coroner's Court, Stratford, in regard to the death of R. Lawrence (aged 29), coal trimmer, who was found seriously injured on an elevated railway in one of the retort-houses of the Beckton Gas-Works.

Mr. H. LUXTON (Messrs. Bedford, Monier-Williams, and Robinson) appeared on behalf of the Gaslight and Coke Company, and expressed their regret at the lamentable accident, offering any assistance it was in their power to render in connection with the inquiry.

Maud Lawrence, the widow, said her husband met with an accident about eight weeks ago, but resumed work on Friday, the 5th inst. He had not complained of anything during the preceding week.

Atholl Hambleton, the assistant-yard foreman at Beckton, said that on the above-named day he sent the deceased to work in No. 3 retort-house to trim coal on the stage. He came back within ten minutes, and said there were tons and tons of coal to shift; and he was told to get on with the work. Witness did not see Lawrence again until he was in the hands of an ambulance party.

Frederick Pegrim said he was a tipper in the employ of the Company. About a quarter to two o'clock on the day in question he was in charge of a train on the elevated railway, and he gave the driver directions to shunt two waggons. He had filled up the hopper in No. 3 retort-house and had two waggons to spare. The line was perfectly clear when they started. He was riding on the buffer of the second and third waggons, and felt the second waggon jump. He stopped the train, and then saw the deceased holding on to a piece of iron at the side of the waggon, which apparently had passed over him.

In reply to Mr. LUXTON, witness said the weight of the waggon was

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 153.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
590,000	10	Oct. 13	10½	Alliance & Dublin 10 p.c.	21—22	..	4 15 5
160,000	10	,,	7½	Do. 7 p.c.	14½—15½	..	4 16 9
200,000	5	Nov. 15	7	Bombay, Ltd.. . .	6¾—7¼	..	4 16 7
40,000	5	,,	7	Do. New, £4 paid	5—5¼	..	5 1 10
50,000	10	Aug. 31	14	Bourne- mouth Gas and Water Co.	29—30	..	4 13 4
51,810	10	,,	7		17—18	..	3 17 9
53,200	10	,,	6		15½—16½	..	3 12 9
380,000	Stk.	Aug. 16	12½	Brentford Consolidated	260—265	..	4 14 4
300,000	,,	,,	9½	Do. New . . .	197—202	..	4 14 1
80,000	,,	,,	5	Do. 5 p.c. Pref. .	125—130	..	3 16 11
206,250	,,	Dec. 14	4	Do. 4 p.c. Deb. .	101—104	..	3 16 11
220,000	Stk.	Sept 15	11½	Brighton & Hove Orig.	222—227	..	4 19 1
246,320	,,	,,	8¼	Do. A. Ord. Stk. .	162—167	..	4 18 10
460,000	20	Sept. 28	10	British	43—44	..	4 10 11
100,000	Stk.	Aug. 16	6	Bromley, Ord. 5 p.c. .	121—124	..	4 16 9
165,700	,,	,,	4½	Do. do. 3½ p.c. .	91—94	..	4 15 9
500,000	10	Oct. 13	7	Buenos Ayres (New) Ltd.	12¼—12⅝	..	5 9 10
250,000	Stk.	Dec. 29	4	Do. 4 p.c. Deb. .	95—97	..	4 2 6
150,000	20	July 13	8¼	Cagliari, Ltd. . . .	24—26	..	6 6 11
100,000	10	Sept. 28	10	Cape Town & Dis., Ltd.	17—17½	..	5 14 3
100,000	10	Oct. 27	4½	Do. 4½ p.c Pref..	10—10¾	..	4 5 9
50,000	50	Nov. 2	6	Do. 6 p.c. 1st Mort.	52—54	..	5 11 1
50,000	Stk.	Dec. 29	4½	Do. 4½ p.c. Deb. Stk.	100—102	..	4 8 3
1,434,680	Stk.	Aug. 31	5⅛	Commercial 4 p.c Stk. .	117—119	..	4 7 4
560,000	,,	,,	5	Do. 3½ p.c. do. .	113—115	..	4 6 11
450,000	,,	Dec. 14	3	Do. 3 p.c. Deb. Stk.	84—86	..	3 9 9
800,000	Stk.	,,	6¼	Continental Union, Ltd.	127—130	+1	5 0 0
200,000	,,	,,	7	Do. 7 p c Pref.	143—148	..	4 14 7
424,070	Stk.	—	5½	Derby Con. Stk. . . .	125—127	..	4 6 8
55,000	,,	—	4	Do. Deb. Stk. . . .	108—110	..	3 12 9
486,090	10	July 28	11	European, Ltd. . . .	22—23	..	4 15 8
354,060	10	,,	11	Do. £7 10s. paid	15½—16½	..	5 0 0
15,223,235	Stk.	Aug. 16	4⅛	Gas-light and Coke	4 p.c. Ord. . .	103—104	..	4 4 7
2,600,000	,,	,,	3⅜		3½ p.c. max. . .	89—91	..	3 16 11
3,799,735	,,	,,	4		4 p.c. Con. Pref.	110—112	..	3 11 5
4,193,975	,,	Dec. 14	3		3 p.c. Con. Deb.	87—89	+1	3 7 5
258,740	Stk.	Sept. 15	5	Hastings & St. L. 3½ p.c.	101—103	..	4 17 1
82,500	,,	,,	6¼	Do. do. 5 p.c.	123—126	..	5 3 2
70,000	10	Oct. 13	11	Hongkong & China, Ltd.	19½—20½	..	5 7 4
3,800,000	Stk.	Nov. 15	10	Imperial Continental .	231—233	−2	4 5 10
473,600	Stk.	Aug. 16	3½	Do. 3½ p.c. Deb. Red.	96—98	..	3 11 5
175,242	Stk.	Aug. 31	6	Lea Bridge Ord. 5 p.c. .	123—128	..	4 13 9
561,000	Stk.	Aug. 16	10	Liverpool United A . .	237—239	..	4 3 8
718,100	Stk.	Aug. 16	7	Liverpool United B . .	172—174	..	4 0 6
306,083	,,	Dec. 29	4	L'rpool Unit'd Deb. Stk.	109—111	..	3 12 1
75,000	5	Dec. 14	5	Malta & Medn., Ltd. .	4¼—4⅜	..	5 5 3
560,000	100	Oct. 2	5	Met. of Melbourne 5 p.c. Deb..	103—105	+2	4 15 3
250,000	100	,,	4½		4½ p.c. Deb.	102—104	..	4 6 7
541,920	20	Nov. 15	3½	Monte Video, Ltd. . .	11½—12½	..	5 12 0
1,565,892	Stk.	July 29	4⅜	Newc'tle & G'tesh'd Con.	107—109	..	4 4 10
406,025	Stk.	Dec. 29	3½	Do. 3½ p.c. Deb.	98—100	..	3 10 0
15,000	10	Aug. 31	10	North Middlesex 10 p.c.	18½—19½	..	5 2 7
52,940	10	,,	7	Do. 7 p.c.	13—14	..	5 0 0
300,000	Stk.	Nov. 30	8	Oriental, Ltd. . . .	148—151	..	5 6 0
600,000	5	Sept. 14	7	Ottoman, Ltd. . . .	6—6½	..	5 7 8
398,490	5	Apl. 28	6	Primitiva Ord. . . .	7—7⅜	..	4 0 0
796,980	5	July 28	5	Do. 5 p.c. Pref. .	5¼—5⅜	+⅛	4 10 11
488,900	100	Dec. 1	4	Do. 4 p.c. Deb. .	97—99	..	4 0 10
851,070	10	Oct. 13	7	River Plate Ord. . . .	12¾—13¼	..	5 5 8
300,000	Stk.	Dec. 29	4	Do. 4 p.c. Deb. .	95—97	..	4 2 6
250,000	10	Sept. 28	7	San Paulo, Ltd. . . .	13—13⅜	..	5 3 8
70,000	50	Jan. 2	5	Do. 5 p.c. Deb. .	50—52	..	4 16 2
135,600	Stk.	Sept. 14	10	Sheffield A	244—246	..	4 1 4
209,984	,,	,,	10	Do. B	244—246	..	4 1 4
523,498	,,	,,	10	Do. C	244—246	..	4 1 4
126,106	Stk.	Aug. 31	5½	Shrewsbury Ord. 5 p.c.	110—120	..	4 11 8
70,000	10	Sept. 28	10	South African	15½—16½	..	6 1 3
6,250,000	Stk.	Aug. 16	5½	South Met., 4 p.c. Ord.	132—134	..	4 2 1
1,895,445	,,	Jan. 11	3	Do. 3 p.c. Deb.	86—88*	+½	3 8 2
575,000	Stk.	Aug. 16	5½	S'th Suburb'n Ord. 5 p.c.	123—126	..	4 7 4
60,000	,,	,,	5	Do. 5 p.c. Pref. .	127—132	+2	3 15 9
112,533	,,	Jan. 11	5	Do. 5 p.c. Deb. Stk.	130—135*	+½	3 14 1
502,310	Stk.	Nov. 15	5	Southampton Ord. . .	109—112	..	4 9 3
120,000	Stk.	Aug. 31	6¼	Tottenham and Edmonton	A 5 p.c. . .	125—128	..	4 17 8
363,620	,,	,,	4¾		B 3½ p.c. .	99—102	..	4 13 2
125,000	,,	Dec. 14	4		4 p.c. Deb.	105—107	..	3 14 9
182,380	10	Dec. 29	8	Tuscan, Ltd.	9½—10	..	8 0 0
149,900	10	Jan. 2	5	Do. 5 p.c. Deb. Red.	99—101	..	4 19 0
30,000	Stk.	Aug. 16	7¾	Wands-worth	A 5 p.c. . .	—	..	—
255,636	,,	,,	6¼		B 3½ p.c. . .	137—140	..	4 9 3
60,000	,,	,,	5 7/40	and	C 3½ p.c. . .	113—116	..	4 13 6
57,564	,,	Dec. 29	3	Putney	3 p.c. Deb. Stk.	80—83	..	3 12 3
745,872	,,	Aug. 16	5	West Ham 5 p.c. Ord. .	106—108	..	4 12 7
185,000	,,	,,	5	Do. 5 p.c. Pref. . .	123—126	..	3 19 4
193,300	,,	Dec. 29	4	Do. 4 p.c. Deb. Stk.	102—107	..	3 14 9

Prices marked * are "Ex. div."

5 tons of coal. He did not see the deceased before he was run over. The engine whistle blew before it came to him. Nobody worked on the elevated railway or alongside of it.

Alfred Mager said he was in charge of the waggons, and was in the act of shunting from No. 3 retort-house when he heard the tipper shout. He went to see what was the matter, and found the second and third waggons lifted, and the deceased trying to stand up in the best way he could by the aid of the ironwork, to which he was clinging. He (witness) could see that the waggon had run over Lawrence's thigh. There were several platelayers working close by. It was customary for him to blow his whistle before he started, and he did so on this occasion.

In reply to Mr. LUXTON, witness stated that when the signal was given to either proceed or back the train he was always looking out to see whether or not the line was clear; and it was so then.

Mr. LUXTON said the custom was, when an engine was coming with trucks of coal to fill the hoppers, to have a signal given; and the platelayers left off work immediately, and stopped until the engine and trucks had passed. They were about 20 or 30 yards away, behind the engine, on the bridge.

Michael O'Connor said he was deputy-foreman in No. 3 retort-house, and the deceased started working with him. His duties were to free the coal from a bunker into the elevator, standing on the stage to do so. The elevated railway would be about 13 or 14 feet above the place where it would be the duty of deceased to work. He had no business whatever to go on to the railway. The last instructions witness gave him were: "Mind, you have nowhere else to go to; you do your work here." He gave Lawrence these instructions because he wished him to remain where he was put, and because he wanted the feeding-gear of that particular bunker kept in action. The coal was right up to the top of the metals of the elevated railway. He did not know which way deceased got up. There was a permanent ladder from the stage under the viaduct, but not for the purpose of coal-trimmers going up. He could not give the Jury the least idea as to why Lawrence was there.

Dr. *Stanton*, House Surgeon at the Seamen's Hospital, Greenwich, said he saw the deceased on the 5th inst., at three o'clock in the afternoon. His side was crushed, and there was an injury to his thigh. His leg was amputated immediately; but he died the following afternoon about four o'clock from shock and hæmorrhage.

The CORONER having pointed out that there was no evidence to show how the deceased got on to the elevated railway, and that his duties clearly had to be performed in another direction,

The Jury, after briefly conferring, returned a verdict of "Accidental death;" adding that no evidence had been adduced to show how the deceased came to be upon the elevated railway.

Reduction in Price.—The Directors of the Hastings and St. Leonards Gas Company announce that the price of gas to ordinary consumers will be reduced to 2s. 10½d. per 1000 cubic feet on and after the current reading of the meters.

COMPETITION OF GAS AND ELECTRICITY.

To the representative of the "Daily Express" lately, Mr. E. Wilmot Seale, of the Charing Cross and Strand Electric Light Company, made a number of statements, to which Mr. F. W. Goodenough, the Chief Inspector of the Gaslight and Coke Company, has given a reply. One of Mr. Seale's assertions is that the electric companies are running away with the power of the gas companies. In reply to this, Mr. Goodenough remarked: "I can only only say that we have more gas-engines in our district than ever before; and their output is increasing in a very satisfactory manner. Gas for power, in fact, is found cheaper than electricity; and it would be so even if only 1d. per unit were charged for the latter. As to the statement that no important case of the substitution of gas for electricity is known by Mr. Seale, we can point to Victoria Station. We told the London, Brighton, and South Coast Railway Company that they could save £900 a year by replacing the electric light with gas. They made the change; and, as a matter of fact, they have saved £1100 per year. Moreover, it is admitted by all parties that the station is better lighted than it was with electricity; the lights being better distributed. The Railway Company are now building a station which will be one of the largest in the kingdom; and we have received the contract for lighting the whole of it; although electricity was offered at 1¼d. per unit. We have also secured the contract for lighting the Broad Street Station of the North London Railway. I may also say that more than 600 consumers who have been using the electric light have come back to us, and another 1000 have partially done so; so that we are not feeling particularly sad about the competition of electricity. I strongly deny that we take contracts at a loss in order to oust the electric companies. The charge for the gas is the same all round. As to our progress in public lighting, I may inform you that we have obtained the contracts for lighting Kingsway and Aldwych, for which the electric companies were also asked to quote. We have also quite recently displaced electricity in the City streets; and we are supplying 1000 more street-lamps than at this time last year. From my knowledge of London street lighting, I should say that electricity is not advancing rapidly in that direction." Mr. Goodenough also disputed the statement that gas-stoves were unhealthy, and quoted the evidence of Dr. Dowie, Dr. des Vœux, and the "Lancet" in support of a directly contrary opinion. There were, he said, hundreds of gas-stoves in the houses of medical men in Harley and Wimpole Streets; and some of them used no other fires. At one nursing home, there were gas-fires in every room in the establishment; and they met with the entire approval of the visiting doctors. With respect to electricity and cooking, Mr. Goodenough said the cost of cooking a dinner for 65 persons by electricity at the Olympia Exhibition was 4s. 8d.; whereas by gas the expense would have been less than 1s. "The number of gas-cookers in our district has increased by 29 000 in the past year," he concluded, "and the heating stoves by about 9000. Gas has, in fact, established itself firmly as the best means of both heating and cooking."

CARBURETTED WATER-GAS APPARATUS

Merrifield—Westcott—Pearson Patents.

The Economical Gas Apparatus Construction Co., Ld.

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The above Company have erected since 1893, or are now erecting, their Universal Type of Carburetted Water-Gas Plant at the following Gas-Works:—

	Cub. Ft. Daily.		Cub. Ft. Daily.		Cub. Ft. Daily.
Blackburn	1,250,000	St. Catherines (Remodelled)	250,000	Tonbridge	300,000
Windsor St. Works, Birmingham	2,000,000	Kingston, Pa.	125,000	Stretford	500,000
Saltley, Works, Birmingham	2,000,000	Peterborough, Ont.	250,000	Oldbury	300,000
Colchester	300,000	Wilkesbarre, Pa.	750,000	Todmorden	500,000
Birkenhead	2,250,000	St. Catherines (Second Cont.)	250,000	Saltley, Birmingham (Third Contract)	2,000,000
Swindon (New Swindon Gas Co.)	120,000	Buffalo, N.Y.	2,000,000	York (Second Contract)	750,000
Saltley, Birmingham (Second Contract)	2,000,000	Winnipeg, Man.	500,000	Rochester (Second Contract)	500,000
Windsor St., Birmingham (Second Contract)	2,000,000	Colchester (Second Contract)	300,000	Newport (Mon.)	250,000
Halifax	1,000,000	York	750,000	Tokio, Japan	1,000,000
Toronto	250,000	Rochester	500,000	Pernambuco, Brazil	125,000
Ottawa	250,000	Kingston, Ont.	300,000	Malton	150,000
Lindsay (Remodelled)	125,000	Crystal Palace District	2,000,000	Duluth, Minn. (Second Cont.)	300,000
Montreal	500,000	Duluth, Minn.	300,000	Brockville, Ont.	250,000
Toronto (Second Contract, Remodelled)	2,000,000	Caterham	150,000	Smethwick	500,000
Belleville	250,000	Leicester	2,000,000	Gravesend	300,000
Ottawa (Second Contract)	250,000	Enschede, Holland	150,000	Newport (Mon.) (Second Cont.)	250,000
Brantford (Remodelled)	200,000	Buenos Ayres (River Plate Co.)	700,000	Toronto (Third Contract)	750,000
		Burnley	1,500,000	Toronto (Fourth Contract)	1,000,000
		Kingston-on-Thames	1,750,000	Montreal, Ont. (Second Cont.)	1,800,000
		Accrington	500,000	Hamilton, Ont.	400,000

Leeds, 1,800,000 C. Ft. Leicester (Second Contract), 1,000,000 C. Ft. Newcastle-on-Tyne, 1,800,000 C. Ft.

And, in addition, 8,150,000 Cubic Feet daily; also Coal-Gas Plants at Nelson, B.C., Chatham, Berlin, Napanee, Owen Sound, Calgary, and Winnipeg.

The subject of "Gas *v.* Electricity" was also dealt with by the "Globe" a few days ago; and in the course of it reference is made to a circular on cooking and heating recently issued by the Gaslight and Coke Company. The author says: "The Gas Company very rightly make a strong point of the cheapness of gas both for heating and cooking compared with electricity. Six cubic feet of gas, costing one-fifth of a penny, will give as much heat as a unit of electricity, the lowest price quoted for which, for the purpose under discussion, is 1d. The answer is not without its own force. Freely admitting the accuracy of the figures quoted, and prefacing the reply with the debating point that the anxiety of the Gas Company to place their case before the public is an acknowledgment of the growing competition of electric heating, health and efficiency are the heads under which the electric lighting companies take their stand. The 6 cubic feet of gas may give as much heat as a unit of electricity; but they ask, How much of it do you get? In nearly all cases (and if they are not, the health consideration comes in with increasing force) gas-fires are provided with chimneys leading into the fire-places in which they are situated, with the result that a large proportion of the heat, even with the best and most modern stoves, finds its way up the chimney; the loss being stated at what is declared a moderate estimate at between 50 and 60 per cent. Gas-stoves were, of course, first in the field; being welcomed for just those reasons which electricity can adduce with the health advantages as a set-off against the greatly increased price. The gas-fire is cleaner than the coal, saving dust and obviating labour; but it cannot, it is contended, make any claim to being a healthy means of heating a room. In the best circumstances, it uses up an amount of oxygen which soon produces an appreciable dryness in the atmosphere; and the acetylene fumes so often given off when coal gas is burned with an insufficient supply of air are, of course, poisonous and produce the effect of a narcotic. No one who is in the habit of using gas-fires can be unconscious of such conditions, or of that trick of 'firing back,' as it is termed, which produces the fumes already mentioned. Granted we are more expensive, says electricity; but considering that our efficient heating is so much greater than gas, with its immense chimney waste, and realizing that if we dry the air, as we needs must, we neither draw off the health-giving properties nor pollute the atmosphere, we hold that we give a better article, if a dearer one. Price must have its influence; but quality, alike in the capacity to do fully what a unit pretends to do, and in the innocuous character of its operations, argues electricity, must surely be put against the cheapness of the 6 cubic feet." After dealing with what is termed the sentimental aspect of the question, and admitting that electric cooking-stoves are still in the experimental stage, the article continues: "And this brings us finally to a consideration of the conditions of the domestic supply of electricity. The competition between the gas and electric lighting companies cannot fail to interest the public, for a wholesome rivalry means in the end efficiency and cheapness. The question naturally arises why the electric supply companies can offer the power as low as 1d. per unit for cooking and heating purposes, while for lighting the cost is so much greater. The answer is that the bulk of the supply for cooking and power is used at the hours of low load, and that it pays to charge a price which is barely cost. Where electric heating is employed, and is carried on for eight hours a day, it constitutes what the companies term a very good load-factor. If electricity for lighting purposes was used at all hours of the day, it could be supplied, we are told, at approximately the same figure as for cooking; but having regard to the fact that there is no restriction as to the cooking hours—and, obviously, none would be possible—we still maintain that the difference between (say) 1d. a unit for cooking and 6d. for lighting is unconscionably great."

As a result of this article, the "Globe" received a letter from a correspondent who signed himself "Five Years with a Gas-Fire," in which, after making various suggestions, the writer remarks: "Electricians say that their heating power is far more efficient than that by gas, because the heat is not being carried up the chimney, neither is the air polluted as with gas. It seems to me that, with a gas-fire and chimney, the air of a room is continually being changed—foul air going out and pure air taking its place; whereas with an electric fire and no chimney, the air in the room would be stationary, and soon get polluted with the human breath."

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The Hamilton Town Council had before them on Tuesday a report by Mr. J. Ballantyne, the Gas Manager, upon the charge made by the Corporation for the use of prepayment meters, which is of more than usual interest, because of its exhaustive nature. The charges in Hamilton are 5d. and 10d. per 1000 cubic feet more than is charged for gas consumed through ordinary meters. Mr. Ballantyne reported that he had gone carefully into the matter, and he found that, as compared with ordinary meters, prepayment meters cost them extra per annum, as follows: Interest and sinking fund, 1s. 0½d.; cost of survey (ordinary meters 0·26d. each time, equal to 0·78d. per annum, prepayment meters 1·93d. each time, equal to 7·72d. per annum) 7d. (ordinary meters are surveyed three times, and prepayment meters four times a year—a man being able to do fully 200 ordinary, and less than 30 prepayment meters in a day); repairs, on ordinary meters, last year, 4 2d. each, on prepayment meters, 1s. 1·2d.—a difference of 9d. (it should, however, be remembered that meters are purchased under a five years' guarantee, and very few of the prepayment meters have been in use for five years, and as they are all, therefore, practically new, the sum eventually required for repairs will be at least double this amount, especially when the mechanism comes to be renewed); attendance to meters by their own plumbers last year cost ¾d. each for ordinary meters, and 8¾d. for prepayment meters—extra, 7½d.; damage

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12 YEARS' Experience in actual building of Benches.

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No Gas-Works is complete unless the above are in use.

NEW CONVEYOR Co., LTD., SMETHWICK.

to meters and robberies last year was equal to 1½d. each; a total of 3s. 1½d. extra. There fell to be deducted from this the bad debts on ordinary meters, amounting to 6½d. each; leaving 2s. 7d. of extra cost. Add extra for eventual repairs, 9d.; making a total of 3s. 4d. more for each prepayment meter per annum, as compared with the ordinary meter. This would require an average consumption of 8000 cubic feet of gas per annum, at 5d. per 1000 cubic feet extra, to clear it. Where they had to fix up the meters, it cost them 1s. additional. In the undernoted towns the extra charge for gas used through prepayment meters was as follows: Aberdeen, 10½d.; Airdrie, 1s. 3d.; Alexandria, 6d.; Alloa, 4d.; Arbroath, 5d.; Barrhead, 10d.; Broughty Ferry, 9d.; Coatbridge, 9½d.; Dumbarton, 7d.; Dumfries, 8d.; Dundee, 6d.; Dumfermline, 7d.; Edinburgh, 1s. 5d.; Falkirk, 4d.; Galashiels, 1s.; Glasgow, 1s. 3d.; Greenock, 7d.; Hawick, 1s.; Inverness, 5d.; Johnstone, 7½d.; Kilmarnock, 6d.; Kirkcaldy, 6d.; Kirkintilloch, 9½d.; Motherwell, 5d.; Newton-on-Ayr, 5d.; Paisley, 1s.; Perth, 4d.; Rothesay, 6½d.; Uddingston, 5d.; Wishaw, 7d.; and Hamilton, 10d. and 5d. In some of the towns, where the extra charge was 1s. and 1s. 3d., a small griller was supplied free along with the meter; but for the extra 10d. charged in Hamilton they included piping and brackets, and they also supplied cookers free up to the size hired out at 5s. per annum All consumers on the free system were entitled to a cooker free if they desired it. Apart from the question of repairs and upkeep to those pipes and brackets, it would require seven yearly payments of nearly 5s. to clear off the original cost, apart from the hire of a cooker. In other words, unless consumers used more than 10,000 cubic feet of gas per annum, there would be no return for the use of a cooker or its upkeep. When a large cooker was taken, the consumption would require to be from 15,000 to 20,000 cubic feet at least per annum. The report was adopted by the Council; the Convener of the Gas Committee—Bailie Hamilton—remarking that it was a most important one to the community. We may add that it is a most important one to more than the community of Hamilton.

It was reported to the Arbroath Town Council on Monday that from May 15 to Dec. 31 there had been an increase of 2,015,600 cubic feet in the quantity of gas manufactured in the Corporation Gas-Works. In his report, the Manager—Mr. A. C. Young—stated that the supplying of cookers and grillers to consumers free of charge had resulted in a large demand by consumers who had not formerly used gas for cooking, and that since May 15 apparatus had been fixed to the following extent: Packed cookers to ordinary meters, 120; do. to prepayment meters, 96; boiling rings, hot plates, and grillers to ordinary meters, 120; do. to prepayment meters, 181—total, 517. The total number of cookers now in use belonging to the Corporation were: Grillers, rings, and hot plates, 301; cookers with ovens, 1098—total, 1399. The Manager submitted for the consideration of the Committee the question of suppying gas-fires at net cost, besides fixing free of charge. The Committee approved of the Manager's suggestion.

A serious state of matters arising out of gas poisoning has been brought up this week, in an action which has been raised before Lord Salvesen in the Court of Session. The pursuers are Messrs. Wm. Dixon, Limited, iron and coal masters, Glasgow. They sue the United Collieries, Limited, Glasgow, for £265. The pursuers are owners of a house at 30, Barracks, Carfin, near Motherwell. They let the house to Jas. Gallacher, a labourer in their employment. On the morning of March 11 last, the entire Gallacher family were found in a state of unconsciousness, owing to an escape of gas in their house, which was the consequence of a gas-pipe having been broken. Mrs. Gallacher died, and the other members of the family are said to have suffered severely. Claims for damages were made upon the pursuers, as being primarily liable, and they settled those claims by payments amounting in all to the sum sued for. The defenders are owners of the minerals under the house; and it is maintained that it was their working of the minerals which caused the facture of the pipe, and that they are under obligation to relieve the pursuers of their outlays in connection with the matter. The defenders deny that the fracture was caused by their mineral workings. They say they are not aware of the precise cause of the occurrence, and that it might have been due to the carelessness of the occupants of the house. The action has been sent to the roll for discussion upon the method of procedure.

On Saturday last, Wm. Kessen, tailor, residing at 36, Marquis Road, Woodside, Aberdeen, and his wife, were charged with the theft of 8s. 7d. from a prepayment meter in their house, between Oct. 20 and Jan. 5. The husband pleaded guilty. But the wife denied the charge; and her plea was accepted. It was stated that the woman had confessed that the money-box of the meter was opened by means of a hair pin. In October last, when the meter was inspected, it was discovered that 6s. was missing from the money-box, and the woman then said that the money had been stolen by a lodger in the house. This statement was accepted at the Gas Office; but inquiry had shown that there was no lodger in the house. Unfortunately, the prosecutor said, a good deal of this sort of theft went on. The woman had gone to the Gas Office and offered to pay the amount charged, but it was refused. Sheriff Robertson gave Kessen the benefit of the First Offenders' Act, which requires him to come up for sentence, if required, at any time within six months.

It has been reported to the Ardrie, Coatbridge, and District Water Trust that during 1905 the rainfall in the area from which the water supply is derived—Upper Lanarkshire, in the neighbourhood of Biggar—was 32·21 inches, as compared with 33·63 inches in 1904. The quantity of water in the reservoirs is 754,116,862 gallons—equal to 216 days' supply—as compared with 713,414,167 gallons at the same date a year ago.

A further report by Dr. Dittmar, the Medical Inspector for the Local Government Board for Scotland, with reference to the water supply of Montrose, was laid before the Montrose Town Council on Monday evening. The water is taken from the River North Esk; and the complaint of the Local Government Board is that it is liable to contamination by sewage. In this report Dr. Dittmar said he had no hesitation in stating that the Montrose water, as at present distributed, should be filtered efficiently before it was distributed to the consumers. The Town Council are evidently in no great hurry to have the subject settled, for, after the documents had been laid before them, they adjourned their meeting.

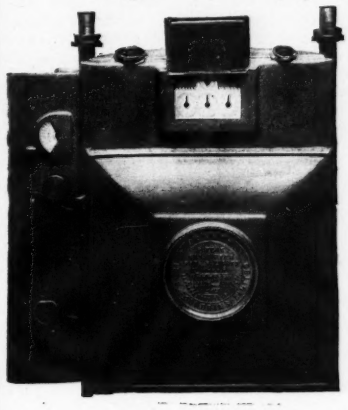
'CANNON' AWARDS

(4 MEDALS)

AT RECENT

Smoke Abatement Exhibition by Royal Sanitary Institute,

Dec., 1905.



MEDAL

FOR

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MEDAL

FOR

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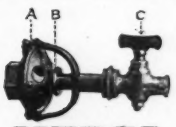
FOR "CANNON" GAS WASHING BOILER.



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DEEPFIELDS, Nr. BILSTON, STAFFS.

London Office and Show-Rooms:

Bath House, 57-60, Holborn Viaduct, E.C.

CURRENT SALES OF GAS PRODUCTS.

Week ending Jan. 13.

There is still no change to speak of in the London market. Pitch is very steady, and for prompt shipment more is required than can be furnished by London. It is thus difficult to understand the recent rumours of sales at a lower figure. Makers' quotation is still 35s. per ton net f.o.b. sellers' works. Benzol, 90 per cent., is hardly so good, being 10d. to 10½d.; and 90 per cent. toluol is 11½d. to 1s. net. 60° crude carbolic acid is, if anything, slightly better at 1s. 9¾d. to 1s. 10d. net, with makers well sold. Sulphate of ammonia is firm, with an upward tendency, at £12 16s. 3d. to £12 17s. 6d., on Beckton terms, for January to April.

LIVERPOOL, *Jan.* 13.

Sulphate of Ammonia.

Supplies have been more abundant, but there has been good demand, and prices have again improved; the closing quotations being £12 8s. 9d. per ton f.o.b. Hull, £12 12s. 6d. per ton f.o.b. Liverpool, and £12 12s. 6d. to £12 15s. per ton f.o.b. Leith. Direct buyers have not kept pace with the recent advance, although there has been considerable inquiry from abroad. Most part of the buying has in fact been for covering February contracts, and it remains to be seen how much further buyers will follow the market. For January-March delivery £12 15s. per ton f.o.b. has been accepted, and about 2s. 6d. per ton less for May-June; and these prices may be taken as the closing values.

Nitrate of Soda.

This article is firm in all positions, and spot prices remain 10s. 9d. and 11s. per cwt. for ordinary and refined qualities respectively.

LONDON, *Jan.* 13.

Tar Products.

Business has been quiet during the past week, and there has been very little inquiry all round. In carbolic acid there is a fair business still being done in crude at 1s. 9½d. for January-March, but consumers decline to pay more than this price for all over the year; while manufacturers hold firm for 1s. 10d., and appear to think they will realize this figure at an early date. In benzol, there are no buyers at anything over 10d. for forward delivery, at which price, however, makers decline to sell, and quote 10½d. for January-June. Toluol still continues very firm at 1s., and there is practically nothing offering for early delivery. Creosote is decidedly quiet, and the London market is certainly easier. Some quantity is reported to have been sold by one of the largest manufacturers at 1⅝d. for early delivery, while a further amount was offered at the same price without finding buyers. Yorkshire makers still decline 1¾d. per gallon, and appear to be not open to sell at under 1⅝d.; while in the Midlands, the principal producers seem to have cleared out all their stocks, and appear to be fairly independent as to the market. In solvent naphtha, the market remains firm, and business has been done at over 1s. for early delivery for ordinary 90 per cent. at 160°, while very good prices have been paid for special qualities with high flash points and heavy specific gravity. Pitch is decidedly dull so far as the Continent is concerned; but there is an improved inquiry from Swansea and Cardiff, where it is reported that some large contracts for patent fuel have been recently arranged for January-June delivery. London makers still ask 32s. 6d. to 33s.; but it is reported that a certain quantity was placed by dealers at under these figures. In Yorkshire, one or two parcels have been placed at 31s. to 31s. 6d., but only for early delivery. With regard to forward, manufacturers do not care to offer large quantities at existing prices. There is a fairly good demand in the Lancashire district, where stocks do not appear to be at all large, and manufacturers are simply selling for early delivery. There is nothing whatever doing in anthracene, and consumers seem to be quite indifferent as to the future of same, while manufacturers here have almost entirely abandoned the production.

The average values during the week were: Tar, 18s. to 22s.; Pitch, London, 32s. 3d. to 32s. 6d.; east coast, 31s. to 31s. 6d.; west coast, 30s. to 31s. Benzol, 90 per cent., 10d.; 50-90 per cent., 10¼d. to 10½d. Toluol, 11½d. to 1s. Crude naphtha, 4d.; solvent naphtha, 11½d. to 1s. 1d.; heavy naphtha, 11½d. to 1s. Creosote, London, 1⅝d. to 11/16d.; North, 1⅜d. to 1⅝d. Heavy oils, 2¼d. Carbolic acid, 60 per cent., 1s. 9½d. to 1s. 9¾d. Refined naphthalene, £4 10s. to £8; salts, 22s. 6d. to 25s. Anthracene, "A," 1¼d. to 1⅝d.; "B," unsaleable.

Sulphate of Ammonia.

The market has been decidedly firmer during the past week, and there has been a fairly good business doing, especially for prompt delivery. Beckton are not offering at the moment; but their nominal price may be taken as from £12 16s. 3d. to £12 17s. 6d. for January-March delivery. In Hull, business has been done at £12 10s. for prompt delivery; while £12 11s. 3d. to £12 12s. 6d. is reported to have been paid for January-March, according to quality and position. In Leith, sales are reported at £12 15s. for prompt delivery by makers, while they decline at present to offer anything forward except at an advance on existing quotations. A fairly good business was done in Liverpool at £12 11s. 3d.; and at the end of the week it is reported that in one instance £12 12s. 6d. was paid for prompt shipment. The market closes with a decidedly firmer tone, and there is a good inquiry for both prompt and forward delivery.

Dartmouth Gas-Works in Danger.—Fire broke out late on Friday night last at the works of the Torbay Paint Company, Limited, Dartmouth. The premises abut on the river embankment on the one side, and on the other are separated by one of the narrow streets of the quaint old town from the gas-works. There was a tremendous blaze from the stock of paint and oil; but fortunately the flames were carried away from the gas-works.

THE

MAXIM PATENT

CARBURETTOR

For Enriching Gas in Bulk.

Prevents Naphthalene Deposits.

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MAXIM PATENT CARBURETTORS

HAVE NOW BEEN FIXED.

Among the Companies and Towns supplied are The Gaslight and Coke Company, Manchester, Exeter, Birmingham, Leeds, Rochdale, Bristol, Sheffield, Oldham, Dundee, Perth, Dunfermline, and many other Works, both large and small, where they have been working in some instances for the past **Ten Years.**

More Gas and Saleable Coke per Ton of Coal Carbonized is produced; saving Capital, Labour, Fuel, Wear and Tear, &c.

THE ENRICHMENT IS INSTANTANEOUS AND PERMANENT.

The Carburettor is inexpensive, easily fixed, and entirely supersedes the use of Cannel.

DEALERS IN

Benzol, Carburine, and all other Naphthas and Oils suitable for the Enrichment or Production of Gas.

For Prices and full Particulars, apply to the

Gas Lighting Improvement Co.

LIMITED,

7, Bishopsgate Street Without,

LONDON, E.C.

COAL TRADE REPORTS.

Lancashire Coal Trade.

During the past week there has been an enlarged trade in house coal. Prices remain steady, and there is no immediate sign of any alteration. A rather better demand is also reported for furnace coal. For some time past trade has been improving in this class of fuel, and although no change in current rates can be said to have taken place, rather better prices are being secured on new contracts. Engine coal continues very steady indeed; and in this department there appears to be every probability of higher rates being charged in the near future. There is at the present time a good inquiry for cannel, and likewise for gas coal. Coke is also meeting with an improved demand at varying prices. Coal for shipping is steady. Quotations at the pit mouth are: Best house coal 13s. 6d. to 14s. 6d., secondary 12s. to 13s., common 9s. to 10s., steam and forge 8s. to 9s., best engine fuel 7s. 6d. to 8s. 6d., best slack 6s. 6d. to 7s. 6d., washed slack 7s. to 7s. 6d., common 5s. to 6s. Shipping coal is 9s. 6d. to 10s. 6d., and furnace coke 15s. to 20s., delivered in Manchester and Salford.

Northern Coal Trade.

The coal trade is very active, and prices have shown some irregular advance owing to the considerable increase in the demand, more especially for the near continental countries. The production of the pits is fuller, and it is well taken up, and in some instances at higher prices. In the steam coal trade, best Northumbrian steams are from 10s. 3d. to 10s. 9d. per ton f.o.b., second-class steams are about 9s. 3d. to 9s. 6d., and steam smalls are firm and rather scarce at 6s. There is also a very strong general inquiry for Durham coals, which has its influence on the gas coal trade. The requirements of the great gas companies are heavy, and take up much of the production, so that there is not a large margin of coal free for early sale. Shipments of gas coal are heavy, and will continue so for some time; the price being from 8s. 6d. to 9s. 6d. per ton f.o.b., according to quality, with the values of the better classes of coal relatively much the firmer. Tenders have been sent in for the large contracts, already named in these columns, for a Scandinavian gas supply; and in about a week the decision on these is expected. One or two smaller gas coal contracts are also in the market. Coke is firm, and advancing in price; and while gas coke is largely produced and is thus very plentiful, the price is steadied by the firmness of ordinary coke. About 10s. 6d. to 11s. is the quotation that is now current, but it varies in different towns.

Scotch Coal Trade.

The market is strong and active. All classes of coal are in demand for prompt delivery; and it is reported that there are negotiations in progress for shipping contracts over the year, the prices for which are much higher than they have been for some time. Everything points to improved conditions of trade. The prices quoted are: Main 7s. 6d. to 7s. 9d. per ton f.o.b. Glasgow, ell 8s. 6d. to 9s. 6d., and splint 9s. 9d. to 10s. The shipments for the week amounted to 102,670 tons—a decrease of 203,648 tons upon the previous week, but an increase of 3012 tons upon the corresponding week of 1905.

Rayleigh Gas-Works have been acquired by Mr. Worthington Church, and will be operated under his management as from the 1st inst. The offices will be at No. 10, Arthur Street West, London, E.C., the address of the other undertakings owned by Mr. Church.

Bursts of Water-Mains.—Bristol and Smethwick were last week the scenes of water-main bursts on a somewhat extensive scale. In the former instance, a number of cellars were flooded; and Messrs. Fry and Sons had a quantity of fancy goods spoilt. The cause of the fracture at Smethwick was a heavy motor-waggon; and a large quantity of water flowed over the Great Western Railway line, washing a portion of the embankment on to the metals. Traffic was naturally considerably interfered with.

Hull Gas and Water Profits and the Unemployed.—At a meeting of the Hull Distress Committee on Thursday, Mr. Ombler moved that an application be made to the City Council for £1000 from the gas and water profits, to be used in providing work for the unemployed. The Chairman (Mr. Henry Feldman) thought the application would have a better chance if the Employment Sub-Committee would back it up with a workable scheme under which the money could be spent; and eventually it was agreed to request the Employment Committee to devise some scheme, with power to apply, through the Finance Committee, for a grant of £1000 from the City Corporation.

Incandescent Gas for Street Lighting at Cardiff.—At a recent meeting of the Lighting Committee of the Cardiff Corporation, the question was discussed of the conversion of the flat-flame burners in the public lamps to the incandescent system, and quotations were received from the Cardiff Gas Company for the work. It was stated that, in the past, ordinary 16-candle power lamps cost £3 3s. 10d. per annum, and that the 70-candle power incandescent burners would be charged at £3 9s. 2d., in addition to the cost of maintenance by the Corporation at an average rate of 9s. per lamp. It was resolved to make the change; and the City Engineer (Mr. W. Harpur) was requested to report as to which streets should be lighted by the new system.

The Landing of Coal Cargoes at Devonport.—The Devonport Town Council had under consideration last Thursday the question of the acceptance of a contract for landing coal for the gas-works at Tamar Wharf for a period of five years at 1¾d. per ton, instead of 3d. per ton which has hitherto been paid. Alderman Hornbrook, the Chairman of the Committee, expressed the opinion that the arrangements in progress would result in the saving of thousands of pounds. Mr. Monk complained that the Committee had not given sufficient consideration to the proposal to improve the Corporation wharf. The cost of this scheme would be only £6000; while the present proposal meant a payment of £193 a year for the use of a private wharf. A motion to refer the recommendation back to the Committee was rejected, and the contract was approved.

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WORKS—CARRON, STIRLINGSHIRE, N.B.

AGENCIES IN ALL LARGE TOWNS.

To Assist the Sale of Coke.

The Croydon Gas Company, by means of a circular sent to every consumer along with his Christmas account, have been drawing attention to the saving to be effected in the cost of household fuel by the use of coke in kitchen and sitting-room grates. It is pointed out that if coke be used in the proportion of about one part (by weight) to two parts of coal, the fires can be made brighter, clearer, hotter, and cheaper than if coal alone is used; while the quantity of soot in the chimneys is sensibly diminished. The following quotation is then given from the paper on "Coke as a Domestic Fuel," which was read by Sir Charles Cookson, K.C.M.G., at last month's congress of the Coal Smoke Abatement Society: "At the present price of broken coke, its cost is nearly half that of household coal as supplied to middle-class houses, and is still cheaper in comparison with coal of an inferior quality, which the poor are obliged to buy in small quantities." After these interesting facts comes the intimation that the Company are prepared to deliver in their district, at low prices, coke of size suitable for household use; and that orders should be for quantities of 6 cwt., or multiples thereof.

Incandescent Gas Lighting in a London Church.

"An object lesson illustrating the severity of the competition which is in progress between gas and electricity for the premier place as an illuminating power, is afforded, says the "City Press," in the case of the church of St. Sepulchre, Holborn. Until a few months ago the building was fitted with sun-lights in the roof and ordinary gas-brackets; but the light afforded was so poor that it was decided to make a change. After careful deliberation, during which the respective merits of electricity and gas were thoroughly weighed, the authorities decided to adopt incandescent gas, which was accordingly installed by the Gaslight and Coke Company. This was some months since; and, after a fair trial, the new system has met with unanimous approval. The church is now one of the best-lighted in the City; while the cost is fully 80 per cent. less than it was formerly. The seven sun-lights and 400 burners have given place to fifteen hanging coronas accounting for 70 burners. During the last quarter of 1904, 177,400 cubic feet of gas were consumed; whereas the consumption of gas for the corresponding period of 1905 was only 96,600 cubic feet.

Price of Gas at Newtownards.—At an adjourned meeting of the Newtownards Urban District Council last week, the Gas Committee reported that they had taken into consideration the proposal that the price of gas should be reduced from 3s. 4d. to 2s. 8d. per 1000 cubic feet; but they advised the Council that it was utterly impossible at the present time to do so. A lengthy discussion ensued, in the course of which Mr. Beckett said the actual cost of producing 1000 feet of gas was only 2d. This remark was very justly characterized by the Chairman as "nonsensical;" and a somewhat lively scene ensued. The report was, however, ultimately adopted.

Suicide by Gas at York.—A few days ago, an employee of the York Gas Company, named Walter Powell, went to look after a number of unoccupied houses of which his brother was the agent. Nothing was seen of him until the following day, when the tenant of a neighbouring house noticed a strong smell of gas, and made an examination. Powell was then discovered dead in a cupboard under the stairs of one of the empty houses. He was found lying on the floor near the gas-meter; while gas was escaping from a newly-bored hole in the pipe fixed there. There was written on the wall "Good-bye," with other words of an undecipherable character. The Jury returned a verdict of "Suicide while temporarily insane."

Dear Electricity at Warrington.—In moving the adoption by the Warrington Town Council of the Street Improvement and Lighting Committee's minutes (which contained a resolution that certain arc lamps should be removed and gas-lamps substituted for them), Alderman Bennett explained that the reason for the resolution was that the Electricity Committee were charging too much for the lamps. Alderman Smethurst retorted that it was not the Committee who were in fault; the fact was that there were too few lights in the street. Mr. Lord, a member of the Electricity Committee, supported the minutes, saying that the lighting was expensive and inefficient, and that if the town had never seen electricity they would have been better off financially and would have had a better light. Mr. Pemberton also contended that the light was too expensive, and that theirs "was not the only town that was giving it up." Mr. Maginn, on the other hand, held that it would be a disgrace to Warrington to go back fifty years, and light the front of the Town Hall with gas. It might be cheaper; but what were they going to do with their plant? Alderman Bennett admitted that it would be a retrograde movement to go back to gas; but he was not satisfied that they were getting an equivalent for the gas. He would, however, withdraw the resolution referred to.

The following resolution has been passed by the Belfast Police Committee: "That the Gas Committee be requested, in cases where incandescent lighting is ordered in macadamized streets, not to insist on the lamp-pillars being set behind the footway kerb."

As the outcome of representations made by the local branch of the United Operative Plumbers' Association, the Blackburn Town Council have decided that in future any new men obtaining employment in the Gas Department must be practical plumbers, and be paid the standard rate of wages.

The Cradley Heath Gas Company have placed an order with Messrs. C. & W. Walker, Limited, of Donnington, for Milbourne's patent luteless purifiers, with 18-inch discs and connections. It includes also the columns, girders, and steel superstructure forming the purifying-house; also elevator and conveyors for oxide, with steam-engine for driving them. The whole of the work will be carried out under the supervision of Mr. Charles Dakin, the Gas Company's Manager and Secretary.

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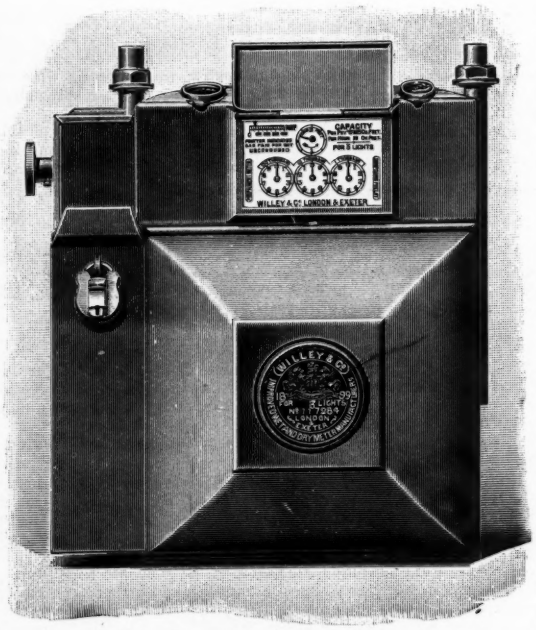
of advantage from the many found in our Slot Meters are:

1st.—They are Fraud Proof, and Cannot be tampered with through the Slot.

2nd.—The Slot is closed when the maximum number of Coins have been inserted.

3rd.—Our Price-Changing System is the Simplest, Quickest, and most Accurate yet devised.



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AGENTS FOR SCOTLAND:

D. M. NELSON & CO., 53, WATERLOO STREET, GLASGOW.

The Gas Committee of the Wokingham Corporation have decided to replace two old benches of direct-fired retorts by a new bench on the regenerative system, and have placed the order for the work with Drakes Limited, of Halifax.

The Bahia-Blanca Water-Works Company, Limited, has been registered with a capital of £312,500, in £1 shares, to acquire any decrees, concessions, contracts, privileges, rights, guarantees, and benefits for the construction, leasing, and working of, and dealing with, water, drainage, and irrigation works and other public works in South America or elsewhere, and to carry on the business of obtainers, storers, sellers, deliverers, measurers, and distributors of water, collectors, removers, treaters, and destroyers of sewage and refuse, &c.

The Chemical Engineering Company and Wilton's Patent Furnace Company have received orders, though Messrs. Corbet Woodall and Son, for complete sulphate of ammonia plants for the Christchurch Gas Company and the Portland Urban District Council.

The members of the Eastbourne Gas Company's Employees' Athletic Club held their annual supper at the Central Depôt last Friday week. By permission of the Directors there was prepared and cooked on the premises an excellent repast, to which about fifty did ample justice; and this was followed by a long and interesting programme of music, &c. The President—Mr. James S. Garrard, Secretary to the Company—presided, supported by Mr. Benjamin Bradford, one of the Directors, Mr. M. L. Lambert, Assistant-Secretary, and Mr. W. J. Ball, Outdoor Superintendent. Some competitions were held.

WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situations Vacant.

ENGINEER AND MANAGER. Pontypridd Gas Department. Applications by Jan. 27.
WORKING MANAGER. No. 4534.
GAS FITTER. Barnoldswick Gas Department. Applications by Jan. 23.
METER INSPECTOR, &c. No. 4533.
MAIN AND SERVICE LAYER AND FITTER. Cefn Gas Company.

Situations Wanted.

POSITION IN GAS-WORKS. No. 4529.
STOREKEEPER OR SHOW ROOM ATTENDANT. Hope, Brighton.

Gas-Works (Complete) For Sale.

PIM, DUBLIN.

Plant (Second-Hand) for Sale.

BOILERS, RETORT MOUNTINGS, VALVES, &c. Ilford Gas Works.
ENGINE AND EXHAUSTER, CONDENSERS, MOUTHPIECES, DIP, &c., PIPES, HYDRAULIC MAIN, BOILERS. Newton Ayr Gas Company.

Plant, &c., Wanted.

STATION METER. No. 4524.

Stocks and Shares.

HARROW AND STANMORE GAS COMPANY. Feb. 6.
LOWESTOFT GAS COMPANY. Jan. 30.
SOUTHEND GAS DEPARTMENT. Jan. 30.

TENDERS FOR

Coke and Breeze.

SWANSEA GASLIGHT COMPANY.

Governors (Station and District).

SWANSEA GAS-WORKS.
BROADSTAIRS GAS COMPANY. Tenders by Feb. 3.

Reservoir (Covered).

BARNET GAS AND WATER COMPANY. Tenders by Feb. 2.

Sulphuric Acid.

HERNE BAY GAS COMPANY. Tenders by Jan. 22.

Tar.

HERNE BAY GAS COMPANY. Tenders by Jan. 22.

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Resists 4500° Fahr. Best for GAS-WORKS.
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Best Prices paid.
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MAIN and Service Layer and Slot Installation FITTER wanted.
State Age, Wage, and References, to MANAGER, Cefn Gas Company, Limited, RUABON.

WORKING Manager for Works making about Two Millions, to take exclusive charge in all branches. Single Man preferred at first, Cottage provided later. Good opening for pushing Man.
Apply, by letter, with *copies* of References, to No. 4534, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

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A PROVINCIAL Gas Company requires a steady reliable Man (about 35), who thoroughly understands the Construction, Testing, Index Taking, and Fixing of Wet and Dry Meters. He will have Charge of other Inspectors, and should be able to take the Illuminating Power of Gas.
Apply, by letter, to No. 4533, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

BARNOLDSWICK URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)
THE Gas Committee of the above Council have a Vacancy for a GAS-FITTER. 30s. per week (49½ hours), rising 1s. per Annum to 33s.
Applicants to have had Practical Experience in Main and Service Laying, the Fixing and Repairing of Meters, Stoves, Fires, &c.; also accustomed to Repairs of Lamps and Incandescent Lighting.
Applications, in Candidate's own hand-writing, stating Age and Experience, accompanied by at least Two *Copies* of recent Testimonials.
Applications to be sent in not later than Tuesday, the 23rd of January, 1906, addressed to J. M. Edmondson, Esq., Chairman, Gas and Water Committee, Town Hall, Barnoldswick.
J. W. THOMPSON,
Manager.

URBAN DISTRICT COUNCIL OF PONTYPRIDD.
(GAS DEPARTMENT.)
APPLICATIONS are invited for the position of ENGINEER and MANAGER to the Gas Undertaking of the above-named Council.
The Salary will be an inclusive one of £300 per Annum.
The person appointed will be required to reside in the House provided by the Council, and to pay therefor a rental of £36 per Annum, in addition to rates and taxes (including gas and water rentals).
Applications (to be submitted on Forms which will be supplied on receipt of stamped addressed foolscap envelope), together with *copies* of not more than Three Testimonials, must be endorsed "Gas Engineer," and received by the undersigned on or before the 27th day of January, 1906.
J. COLENSO JONES,
Clerk to the Council.
District Council Offices,
Pontypridd, January, 1906.

WANTED to Purchase, Gas Carbon delivered at nearest Station to Gas-Works, in quantities of not less than Four Tons.
State Price to No. 4512, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

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MANUFACTURERS of Station and DISTRICT GOVERNORS are requested to furnish full Particulars, Plans, and Prices of the latest Improved Design and Construction to THORNTON ANDREWS, Gas-Works, SWANSEA.

STATION Meter (Second-Hand) Wanted. Capacity, about 40,000 cubic feet per hour. Must be Modern (Faced-Joints preferred) and in Perfect Condition.
State all Particulars to No. 4524, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters. Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
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M. LEVY ON INCANDESCENT GAS LIGHTING.
THE attention of Engineers, Con-tractors, Manufacturers, and others interested in the use of Gas for Lighting, Heating, and Motive Power, is called to the work on "INCANDESCENT GAS LIGHTING," by M. PAUL LEVY, C.E., of Paris, which was noticed in the "JOURNAL" on the 21st of November. It is a large volume of 284 pages, with 127 figures and 8 large plates.
Copies may be obtained at the Office of the "JOURNAL," at the Price of 8s. 6d. each, post free.

SECOND-HAND Plant for Sale by the Newton Ayr Gas Company—
1 STEAM ENGINE and EXHAUSTER, 10,000 cubic feet per hour.
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Will be Sold Cheap. Particulars from the Manager, J. GIBB.

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PAIR of Boilers, 17 ft. by 5 ft. 9 in., Lancashire Type, 11 Galloway Tubes to each, new 1897, insured 90 lbs. Steam Pressure, Valves, Mountings, &c., complete. Seatings if desired. One Boiler is fitted with Wilton, the other with Meldrum's, Forced Draught Furnaces for low-grade Fuels.
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These Boilers have been in regular work until within a month of date, and may be seen on application.
Six sets of RETORT MOUNTINGS, including Mouthpieces, 15 in. by 21 in. (oval), Self-Sealing Lids, Ascension, Bridge, and Dip Pipes, Hydraulic Mains (D-Section), &c. Cheap.
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Gas-Works, Ilford.

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THE Directors of the above Company invite TENDERS for the supply and erection of Two 10-inch STATION GOVERNORS (Braddocks) with Connections complete.
Full Particulars may be obtained from the undersigned.
Tenders to be sent in not later than Feb. 3, addressed to the Chairman of the Company, Gas Office, Broadstairs.
The lowest or any Tender not necessarily accepted.
By order,
F. HIGGINSON, Assoc.M.Inst.M.E.,
Engineer and Secretary.
Gas Office. Broadstairs,
Jan. 13, 1906.

HERNE BAY GAS AND COKE COMPANY, LIMITED.
SULPHURIC ACID.
THE Directors are prepared to receive TENDERS, on or before Monday, Jan. 22, 1906, for the supply of about 40 Tons of SULPHURIC ACID, to be delivered during the Twelve Months ending Jan. 31, 1907.
Particulars of Contract, and Form of Tender, may be obtained from the undersigned.
The Directors do not bind themselves to accept the lowest or any Tender.
C. V. BENNETT,
Manager.
Beach Street, Herne Bay.

HERNE BAY GAS AND COKE COMPANY, LIMITED.
TAR.
THE Directors are prepared to receive TENDERS for the surplus TAR produced at their Works during the Twelve Months ending Jan. 31, 1907.
The estimated quantity is 40,000 Gallons.
Particulars of Contract and Form of Tender may be obtained from the undersigned.
Tenders to be sent in on or before Monday, the 22nd of January, 1906.
The Directors do not bind themselves to accept the highest or any Tender.
C. V. BENNETT,
Manager.
Beach Street, Herne Bay.

TO CEMENT MANUFACTURERS, BRICK MAKERS, AND OTHERS.
THE Swansea Gaslight Company are prepared to receive TENDERS for the purchase of their surplus COKE, for delivery over the next Twelve Months, f.o.b. South Dock, Swansea, or f.o.r.
There is connection with the G.W. Rly., L. & N.W Rly., Midland Rly., and R. & S.B. Rly.
Also they offer 2000 to 3000 Tons of BREEZE.
THORNTON ANDREWS,
Engineer.
Dec. 27, 1905.

GAS-WORKS FOR SALE.
EDMUNDSONS' FURNISHING AND ENGINEERING CO., LTD., IN VOLUNTARY LIQUIDATION.
THE undersigned is prepared to receive OFFERS for the purchase, as Going Concerns, of either or both of the following GAS-WORKS:—
1.—GAS-WORKS AT WESTPORT, Co. Mayo, Ireland, consisting of Manager's Dwelling House, Coal-Store, Gas-House, Retorts, Purifying Apparatus, Gasholders, 30 feet by 10 feet and 15 feet by 10 feet respectively, Mains, Services, and Meters.
2.—GAS-WORKS AT CARRICK-ON-SHANNON, Co. Leitrim, Ireland, consisting of Manager's Dwelling House, Coal-Store, Gas-House, Retorts and Purifying Apparatus, Gasholder, 30 feet by 12 feet, Mains, Services, and Meters.
Further Particulars can be obtained from
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Liquidator,
36, College Green,
DUBLIN.

BARNET DISTRICT GAS AND WATER COMPANY.
TENDERS are invited by the above Company for a COVERED SERVICE RESERVOIR, capable of holding about Two Million Gallons, to be constructed on the Company's land at Arkley, in the County of Hertfordshire, in accordance with Plans and Specification which can be inspected at the Company's Offices, Station Road, New Barnet.
Further Particulars can be obtained of the Company's Engineer and Manager, Mr. T. H. Martin, Assoc. M.Inst.C.E.; and copies of the Plans and Specification will be supplied on payment of One Guinea, to be returned upon receipt of a *bonâ-fide* Tender.
Sealed Tenders, to be sent in on or before Ten a.m. on Friday, the 2nd of February, 1906, addressed to the Chairman of the Company, 30, Gracechurch Street, London, E.C.
The Directors do not bind themselves to accept the lowest or any Tender.
T. H. MARTIN, Assoc.M.Inst. C.E.,
Engineer and Manager.
Station Road, New Barnet,
Jan. 5, 1906.

ISSUES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.
MR. ALFRED RICHARDS begs to notify that his ISSUES by AUCTION under PARLIAMENTARY POWERS of STOCKS and SHARES in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.
Terms for Issuing such Capital, and also for including Gas and Water Stocks and Shares belonging to Private Owners in these Periodical Sales, can be obtained on application at MR. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
SOUTHEND GAS COMPANY.
NEW ISSUE OF £13,500 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.
MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, Jan. 30, at Two o'clock, in Lots.
Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
LOWESTOFT WATER AND GAS COMPANY.
NEW ISSUE OF 400 ADDITIONAL ORDINARY £10 SHARES,
Ranking for a Maximum Dividend of 7 per cent., equally with similar Shares now receiving 5½ per cent.; also
£1000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.
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Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
HARROW AND STANMORE GAS COMPANY
NEW ISSUE OF 500 £10 "C" SHARES.
MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, Feb. 6, at Two o'clock, in Lots.
Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

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Now Ready, Price 15s., Limp Cloth.

TWENTY-FIFTH YEAR.

AN

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OF THE

METROPOLITAN WATER COMPANIES

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AND OF THE

ACCOUNTS OF SOME OF THE PRINCIPAL

PROVINCIAL WATER UNDERTAKINGS

FOR THE YEAR 1904-1905.

Compiled by

WOOD, DREW, & CO.,

Chartered Accountants.

LONDON:

WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

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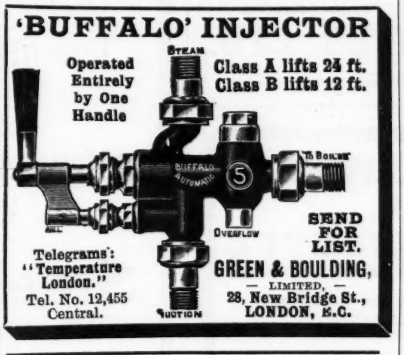

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JAMES OAKES & CO.,

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Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.

Manufacture and keep in Stock at their Works (also large Stock in London)

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Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.

Special Lumps, Tiles, and Bricks for Regenerative and Furnace Work.

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for determining the calorific value of gases

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Makers of Scientific Apparatus,

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HEATHCOTE GAS COAL.

Rich in Illuminating Power and yield of Gas.

Above the Average in Weight and Quality of Coke.

Maintains a High Standard in Residuals.

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CHESTERFIELD.

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LIMITED,

STOURBRIDGE,

Manufacturers of

FIRE-BRICKS, LUMPS, TILES,

GAS RETORTS,

And every description of Fire-Clay Goods.

RETORTS CAREFULLY PACKED FOR SHIPMENT.

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MANUFACTURERS OF

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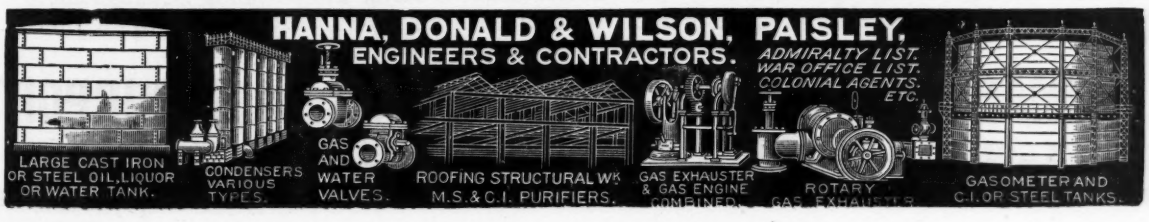
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Illustrated Advertisement, with full Particulars, in "JOURNAL" for April 4, 1905, p. 66.

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UNBREAKABLE

INCANDESCENT MANTLE

Made in England, by a secret process, from 3-ply Ramie and strengthened to prevent breakage, 100-Candle power.

OUTSHINES & OUTLASTS ALL OTHERS.

Sample Dozen, post free 2s. 11d.

Second Quality Mantles, Special Line, 18s. per Gross.

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GAS PLANTS.

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CAST-IRON AND STEEL.

Patent Pressed Steel Tanks from Stock.

HUMPHREYS & GLASGOW'S CARBURETTED WATER-GAS PLANTS.

Steel Structures

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THOMAS PIGGOTT & CO., LTD.,

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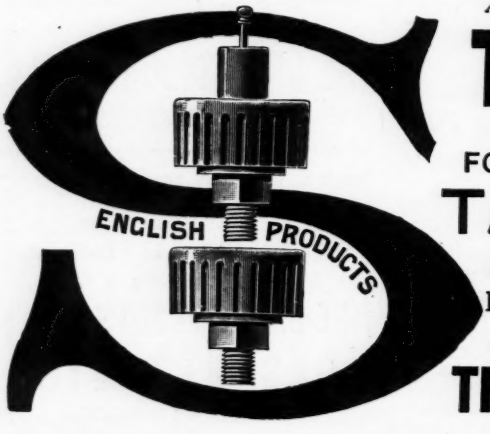
A BOON TO MASTER, MAN, and MACHINE.



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The "Gas World" Analyses of the Accounts of Gas Undertakings show that the HIGHEST RESULTS in GAS MADE and GAS SOLD per Ton of Coal Carbonized were obtained at SCARBOROUGH, where improved Klönne Retort Settings, constructed by us, are SOLELY in use. Many other Towns where these Settings have been adopted are also giving splendid results both as to Gas Made and Coke Sold.

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Full Particulars may be obtained from the Sole Makers,

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Gas Bags for repairing Mains Round Shape. All Seams Stitched and Taped.

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Oilskin Clothing, Diving and Wading Dresses, Sewer Boots, Tar Hose, Stokers' Mitts, Bellows, &c.

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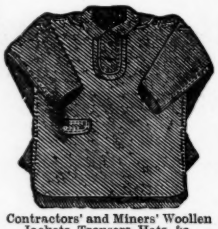

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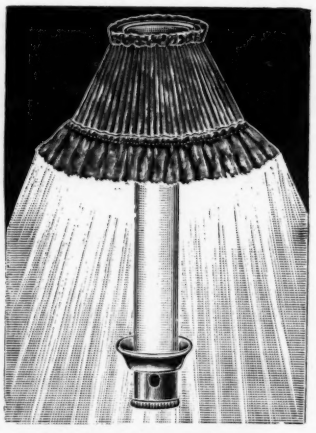

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'ROYAL' INCANDESCENT GAS-LIGHT CANDLE.

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A perfect combustion Burner.

Cannot get out of order.

60-Candle Power with 2½ cubic feet of Gas.

Can be used anywhere instead of a "C" Burner.

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CAPACITY OF PURIFIERS DOUBLED.
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Maximum Efficiency Guaranteed.

A LARGE NUMBER OF PLANTS IN OPERATION.

Every Requirement for Gas-Works.

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(PATENTED)

Fig. 35. 100 c.p.

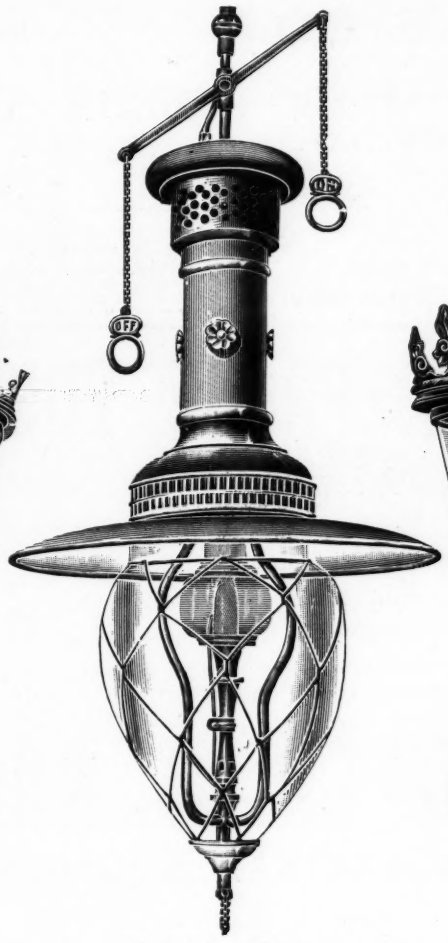

Fig. 607. 600 c.p.
Self-Intensifying.

Fig. 35a. 300 c.p.
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WELSBACH "C," "CX," AND PLAISSETTY MANTLES,

4½d. each, subject.

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MANUFACTURERS OF

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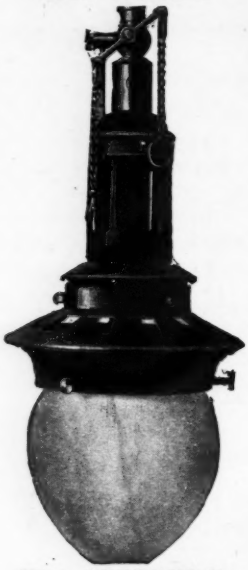

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These Patent Machine-Made Retorts possess the excellent quality of remaining as near stationary as possible under the varying conditions of their work—a quality which will be appreciated by all Gas Engineers and Managers. The generally expressed opinion is that these Retorts are the very best that are made. *Retorts carefully Packed for Export.*

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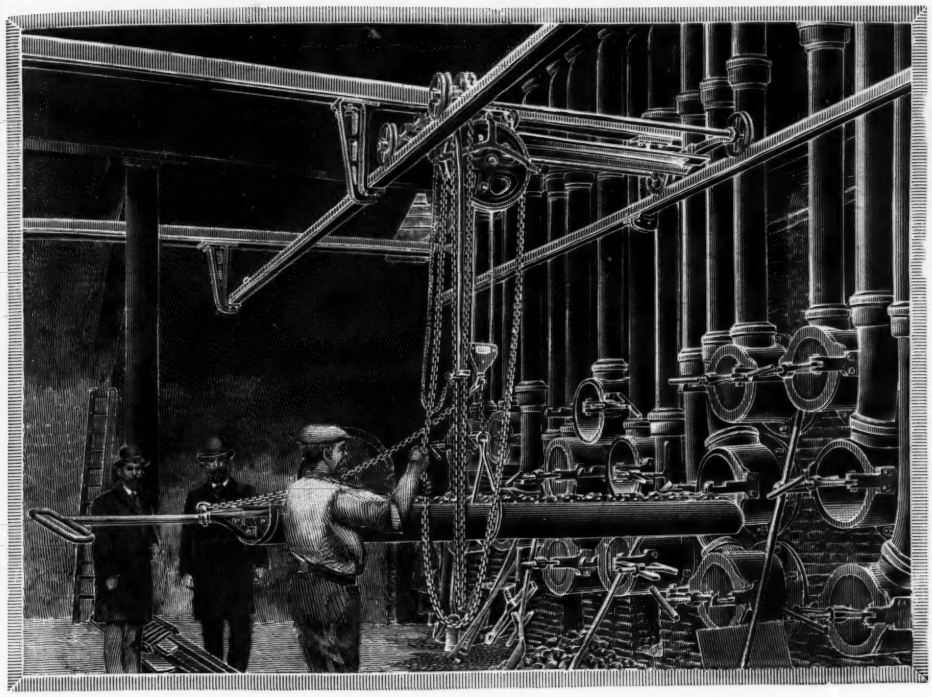

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Annual Yield per Retort increased many thousands of feet.

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INVERTED GAS BURNER is the most up-to-date LIGHT

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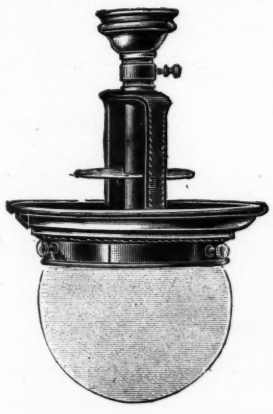

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The nearest possible approach to Electricity.

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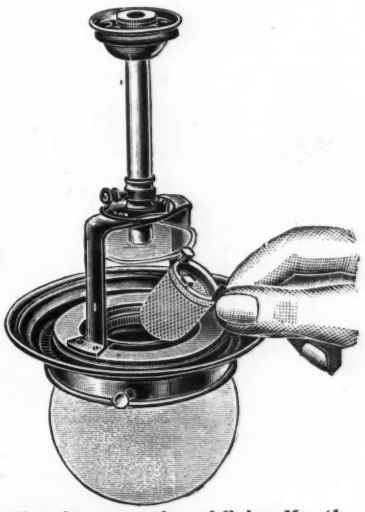

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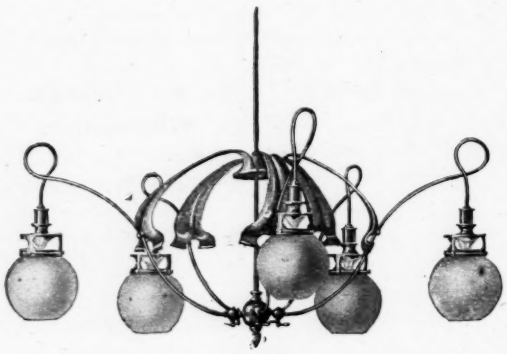

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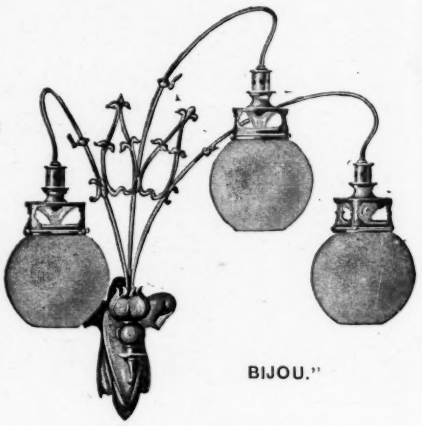

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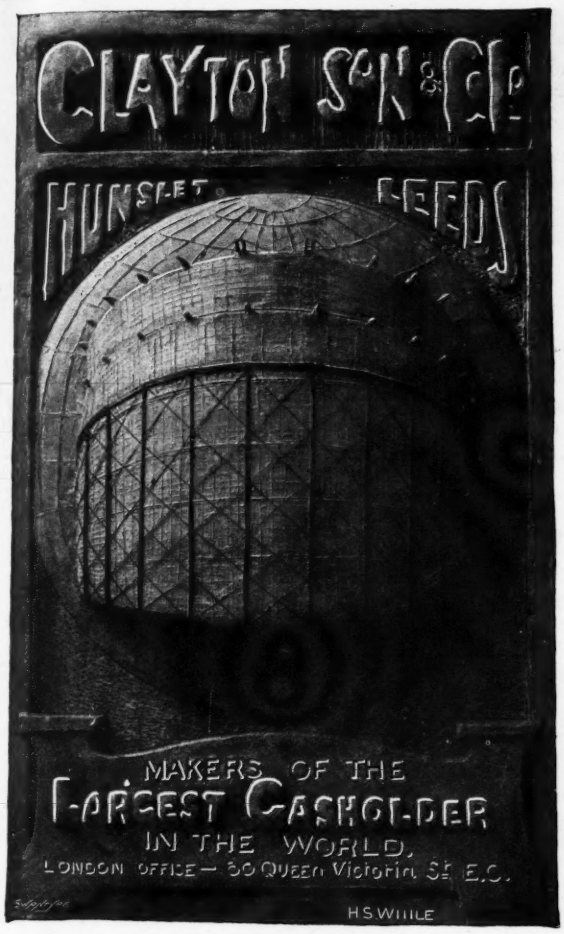

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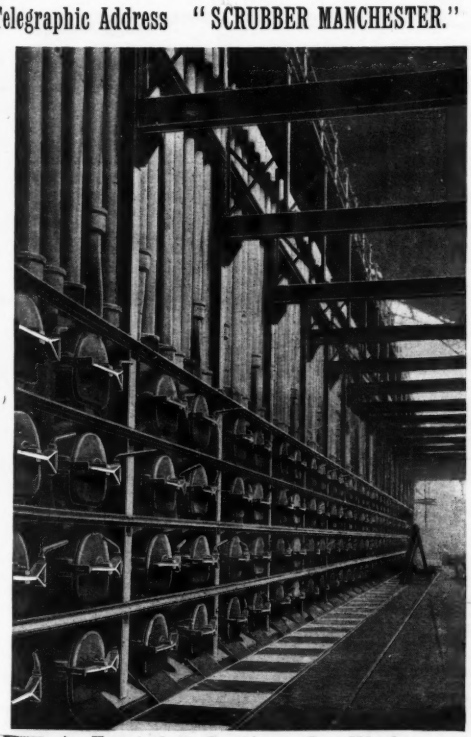

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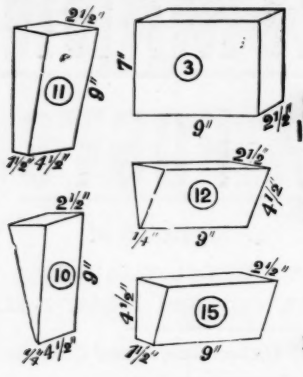

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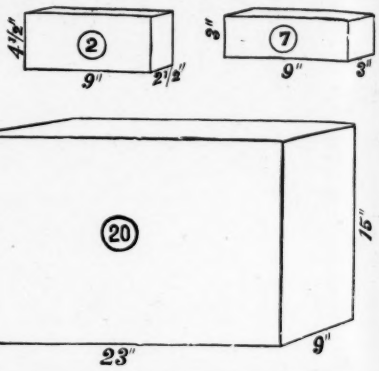

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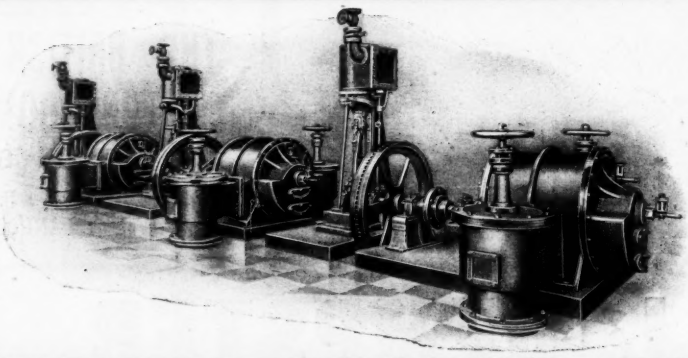

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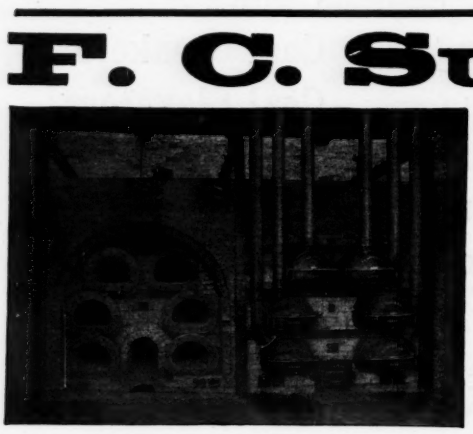

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